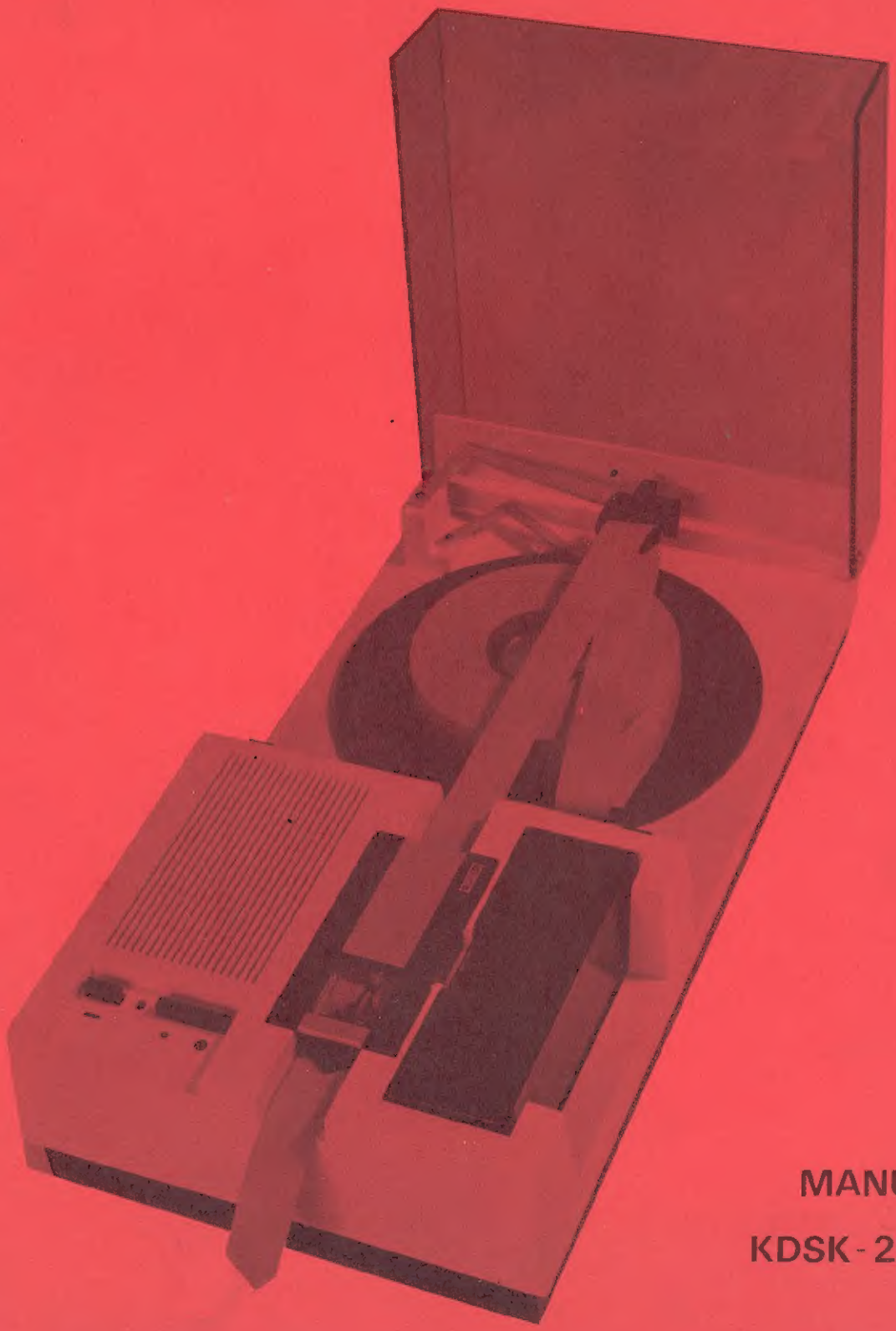
GNT 3601
Tape Punch Station



MANUAL

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GNT AUTOMATIC A/S

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ILLUSTRATIONS

SECTION 1

GENERAL DESCRIPTION

GNT 3601 Tape Punch Station

The GNT 3601 table-top punch station is a compact, low-priced unit with an elegant, modern design.

It utilizes the highly reliable GNT 36 punch mechanism, is extremely easy to operate and maintain, and features sophisticated microprocessor electronics.

1.1 INTRODUCTION

The GNT 3601 is a self-contained punch station for data registration on paper or mylar tape.

Either 5 and 8 channel ISO or 6 channel TTS data can be punched according to the die-block installed in the punch mechanism.

The standard interface accepts parallel data and is TTL compatible. An RS232/V24 serial input is optional.

2 versions are available with maximum punching speeds of 50 and 75 char./s, respectively.

The tape dispenser handles an 8" roll and includes tape low and tape error sensors.

Chad is collected in a transparent chad box.

The GNT 3601 has two built-in test programs for testing the punch mechanism.

1.2 FUNCTIONAL DESCRIPTION

Tape is fed from the turntable, around a fixed roller and a movable roller on an arm which maintains correct tape tension and also senses tape out or taut tape. A second arm senses tape low.

Tape is drawn through the punch by a sprocket wheel and perforated by punching needles which are electromagnetically selected according to the input data. Power for driving the needles is supplied by a d.c. motor. No clutch is used between the motor and the main shaft of the punch mechanism.

Data and feed signals are synchronized by a photoelectric timing generator.

The microprocessor-based interface includes parity check, motor speed regulation and automatic motor start/stop. Characters are accepted immediately.

The interface can be strapped to tailor the punch station to individual needs.

SECTION 2
SPECIFICATIONS

2.1 GENERAL

Dimensions

Length . . . . . 477 mm
Width . . . . . 246 mm
Height. . . . . 122 mm

Colour

Cabinet . . . . . White/black
Lid . . . . . Transparent, smoke-coloured

Weight

5.3 kg

Mounting

Free-standing, table-top unit

2.2 ENVIRONMENT

Temperature

Ambient operating. . . . . $+5^0$ C to $+40^0$ C
Ambient storage . . . . . -40^0 C to $+70^0$ C

Humidity

15 – 95% RH, non-condensing

2.3 A.C. SUPPLY

115 V Version

Voltage . . . . . 100 – 125 V
Frequency . . . . . 47 – 63 Hz

230 V Version

Voltage . . . . . 200 – 250 V
Frequency . . . . . 47 – 63 Hz

2.4 TAPE

Material

Paper, according to ISO 1729
Mylar/foil/mylar
Metalized mylar
Polyester

Form

Rolls. . . . . max. diameter 8", standard 2" core

Width

11/16" (17.5 mm), 5 unit (ISO)
7/8" (22.2 mm), 6 unit (JIS)
1" (25.4 mm), 8 unit (ISO)
or
7/8" (22.2 mm), 6 unit (TTS)

Thickness

0.05 – 0.12 mm

2.5 PERFORMANCE

Punching speed

50 char./s ± 10% or 75 char./s ± 10%

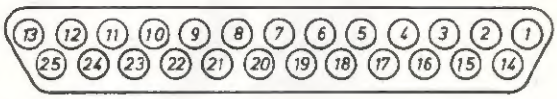
Type of punching

ISO, 5 or 8 unit (ISO R1154)
JIS, 6 unit (central feed hole)
or
TTS, 6 unit (advanced feed hole)

Auto Start/Stop

PUNCH starts motor. Characters accepted without delay. Motor stops approx. 10 s after last character

2.6 INPUT AND OUTPUT SIGNALS



Signal Connector, Cannon DB-25S, seen from rear

Pin No.	Signal	Function
1-8	DA1-DA8	Data input
9		No connection
10	BS	Back-Space
11	PUNCH	Punch command
12	READY	Ready to receive data
13	$\overline{\text{TOUT}}$	Output of tape out switch
14-15		No connection
16	$\overline{\text{ODPA}}$	Odd parity check
17	$\overline{\text{EVPA}}$	Even parity check
18	$\overline{\text{PAER}}$	Parity error
19	$\overline{\text{TLOW}}$	Output of tape low switch
20	ERROR	Error which stops punching
21	TAPE LOW	Tape low signal
22-23		No connection
24	5 V	D.C. output, 5 V, 0.3 A
25	GND	Signal ground

The GNT 3601 can be strapped so that the logic is inverted on the DATA and/or PUNCH signals. See section 3.8.

All signals are TTL compatible. See the timing diagram, fig. 3.2.

For back-space, both PUNCH and BS must be high.

2.7 RELIABILITY

MTBF . . . . . 10^8 char.
MTBE . . . . . 10^7 char.
MTTR . . . . . 10 min.
Life . . . . . 3×10^8 char.

2.8 MANUAL CONTROLS

Pushbutton 1

Power on/off

Pushbutton 2

Tape Feed / Test Program I

Pushbutton 3

Delete / Test Program II

Indicator LED

Power on . . . . . Constant light
Error . . . . . Fast flash
Tape low . . . . . Slow flash

SECTION 3

OPERATING INFORMATION

3.1 UNPACKING AND INSPECTION

Inspect the shipping carton for visible signs of damage incurred during transit. Unpack the carton, and check the contents against the shipping documents. Any damage or omissions should be reported immediately.

3.2 INSTALLATION

The GNT 3601 Punch Station is a free-standing, table-top unit.

3.3 MANUAL CONTROLS (See fig. 3.1)

3.3.1 Pushbutton 1 (Power On)

When this button is depressed, the d.c. supply to the electronics is switched on, and the microprocessor is reset. Power is automatically applied to the motor when the first PUNCH signal arrives.

When the button is released, the power is switched off.

3.3.2 Pushbutton 2 (Tape Feed / Test Program I)

When this button is depressed and held, tape is drawn through the machine and punched with feed holes only. Tape feed continues until the button is released.

Test program I, which is a binary counting code suited for automatic testing, is activated by holding button 2 while at the same time pushing Power On.

To stop the test program, depress either button 2 or 3.

3.3.3 Pushbutton 3 (Delete / Test Program II)

When this button is held down, the tape is punched with holes in all channels.

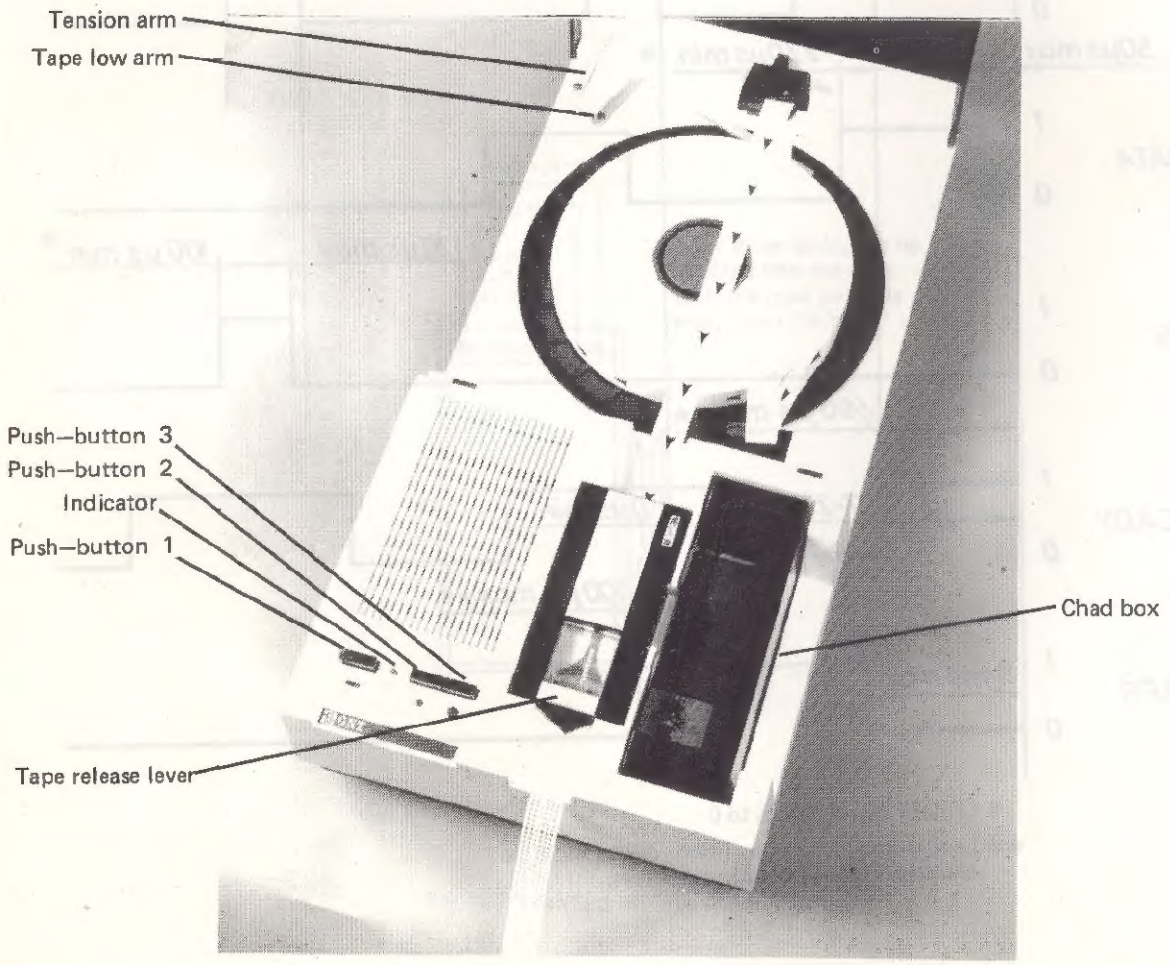


Fig. 3. 1, GNT 3601 Operation

Test Program II, which is a 4-4 code suitable for visual testing, is activated by holding button 3 while pushing Power On. To stop the test program, depress either button 2 or 3.

3.3.4 Indicator LED

The indicator LED signals power-on, tape low and error as follows:

Constant light. . . . . Power On
Slow flash . . . . . Tape low
Fast flash. . . . . ERROR

When ERROR is indicated, punching is automatically stopped, and READY goes low. ERROR occurs when there is tape out, taut tape, incorrect motor speed or lack of synchronization between the timing disc and the electronics. When the error has been corrected, the indicator stops flashing, and READY goes high again.

3.4 CONNECTIONS

3.4.1 A.C. Power Supply

The correct a.c. power supply is selected by the line voltage selector switch on the rear of the instrument.

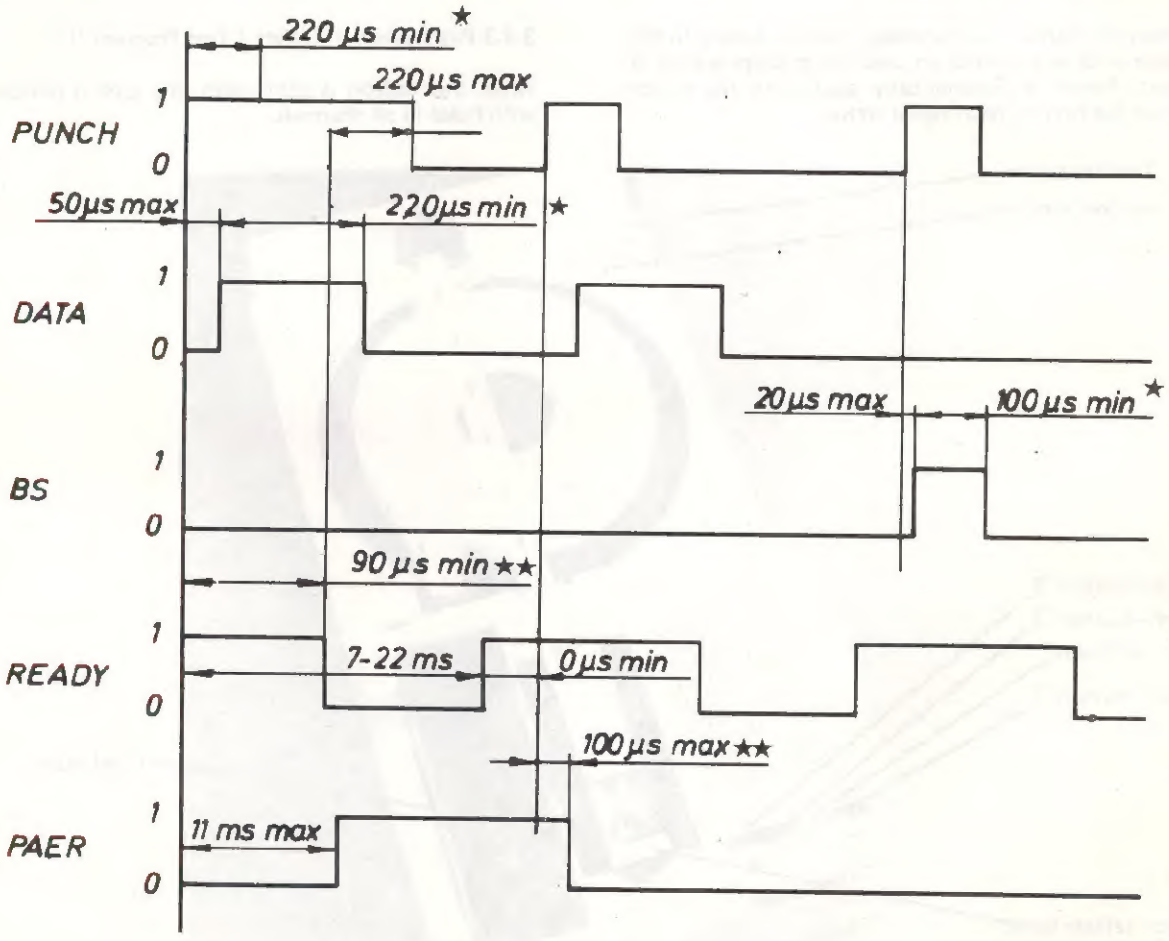
3.4.2 Power Receptacle and Fuse

The input socket accepts a standard business machine plug.

There is one fuse located on the power supply p.c.b. See section 4 for the fuse specifications.

3.4.3 Signal Connections

The standard parallel and serial signal connectors are Cannon DB-25S which are mounted at the rear of the instrument. See section 2.6 and 8.2 for the pin connections.



★ Or until READY goes to 0

★★ Longer under noisy conditions due to multiple checks performed by microprocessor

Fig. 3. 2, Timing Diagram

3.5 TAPE LOADING

1. Depress the power-on button and see that the indicator lights up.
2. Open the lid and place a roll of tape on the turntable.
3. Thread the tape around the two rollers as shown in fig. 3.1.
4. Depress the tape release lever so that the transparent window pops up.
5. Slide the tape into the punch mechanism until the sprocket wheel is covered.

   If the machine is an ISO version, the factory setting is for 8 channel tape. If 5 channel tape is to be used, set the tape guide springs as follows:

   a) Remove the punch mechanism and top cover (see section 5.1.4).

   b) Place the tape guide springs for 5-unit tape (fig. 3.3).
6. Snap the window closed, and depress the tape feed button until a sufficient leader has been punched.

3.6 CHAD BOX

The clear plastic chad box is removed for emptying by pressing it slightly downwards and then lifting it up and out. To remount, merely press it into place.

3.7 INPUT AND OUTPUT SIGNALS

See the Timing Diagram, fig. 3.2.

3.8 STRAPPING PROCEDURE

The GNT 3601 has the following strapping possibilities:

Positive or inverted Data logic (R8)
Positive or inverted PUNCH command (R5)

From the factory, the logic circuit board is strapped for positive DATA and PUNCH signals. See fig. 4.9a for the locations of the straps (1 kΩ resistors).

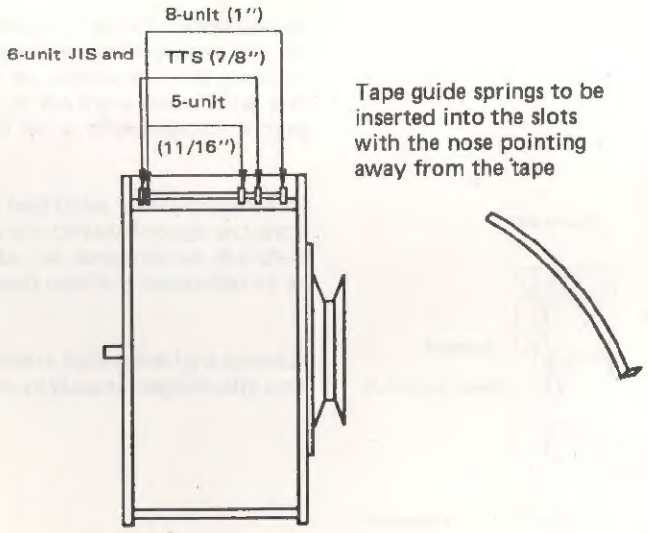


Fig. 3.3, Location of Tape Guide Springs

SECTION 4

TECHNICAL DESCRIPTION

4.1 MECHANICAL DESIGN

4.1.1 General

The GNT 3601 table-top punch station consists basically of a GNT 36 punch mechanism, a tape dispenser, chad box, motor and power supply unit and logic board. The case is divided in two sections, top cover and base, both of which are made of plastic. The tape dispenser lid is transparent.

The GNT 36 punch mechanism is fastened to the top cover by a single clamp and is therefore easy to remove for servicing.

Motor torque is transmitted to the punch mechanism by an O-ring drive belt. No clutch is used.

The punching needles are controlled by a selector box containing 9 electro-magnets.

The tape dispenser comprises turntable, tension control mechanism, and tape out, taut tape and tape low sensors.

4.1.2 GNT 36 Punch Mechanism, Functional Description

The GNT 36 is a synchronous punch, which means that its main shaft is in constant rotation and that data and feed pulses must be applied at times governed by the angular position of the main shaft. Pulse synchronization is ensured by a photo-electric timing generator.

Perforation of code and feed holes is accomplished by punching needles which are driven through and withdrawn from the tape by an eccentric on the main shaft. The selection of each needle is controlled by an electro-magnet.

The tape is moved forwards or backwards by a sprocket wheel which is driven via an electro-magnetically activated dog clutch.

4.1.3 Punching (See fig. 4.1)

The motor drives the flywheel via a round-sectioned drive belt. The flywheel is connected to the eccentric main shaft which rides on ball bearings at both ends. The main shaft punch eccentric is in constant engagement with the punching bridge which holds the interposers. If a punching needle is to be selected, its corresponding interposer moves forward (solenoid activated) while the punch eccentric is moving through BDC. The interposer tip slides under the needle so that the needle follows the movement of the punching bridge, and is positively driven through the tape. The solenoid is then deenergized, and the interposer withdrawn by a spring as soon as it is free. The needle is positively pulled down by the extractor (see also section 4.1.5).

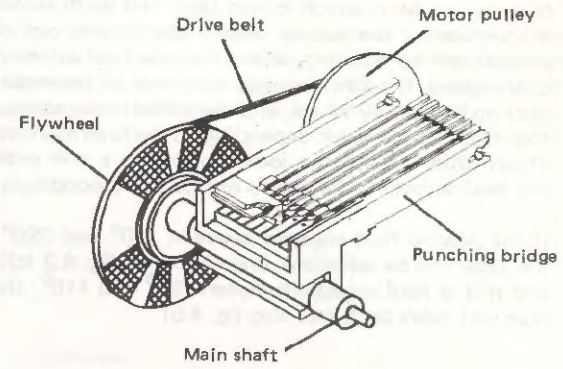


Fig. 4.1a. Punching Mechanism

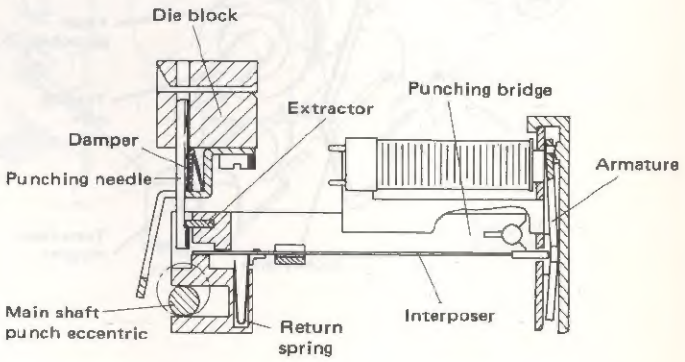


Fig. 4.1b, Punching Mechanism

4.1.4 Tape Feed (See fig. 4.2)

Tape feed (forward or back) is accomplished by a sprocket wheel which engages with the tape feed holes. The sprocket wheel is fastened concentrically to a jockey wheel which ordinarily is held in position by a sprung roller arm. On the side of the jockey wheel are radial slots which form the driven part of the dog clutch.

At the end of the main shaft opposite the flywheel is a small feed eccentric. This eccentric is connected by a rod to the feed clutch housing which therefore rocks as the main shaft rotates. Fastened inside the clutch housing is a pawl which moves back and forth across the surface of the jockey wheel, but is held out of engagement by a spring. When the tape feed solenoid is energized, the pawl engages with one of the radial slots on the jockey wheel, and the wheel rotates either forwards or backwards depending on the time moment of activation. Since the jockey wheel is a unit with the feed sprocket, the tape is moved correspondingly.

If the pawl is held engaged between 110^0 and 290^0, the tape will be advanced one pitch (see fig. 4.2 (c)), and if it is held engaged between 290^0 and 110^0, the tape will move back (see also fig. 4.5).

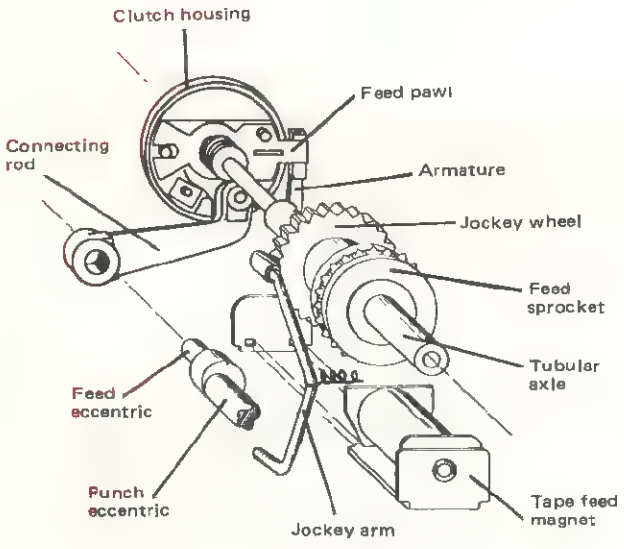


Fig. 4. 2a, Tape Feed Mechanism

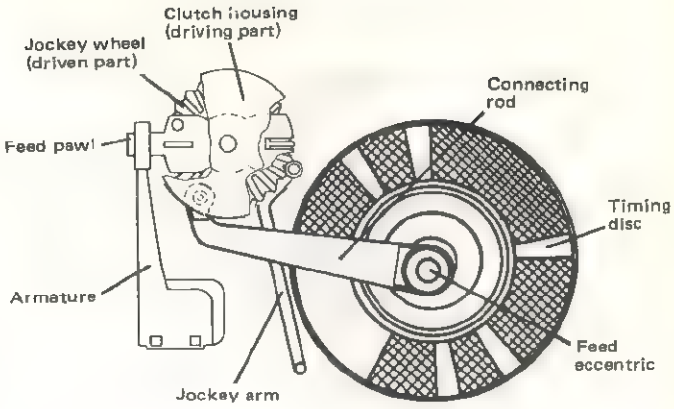
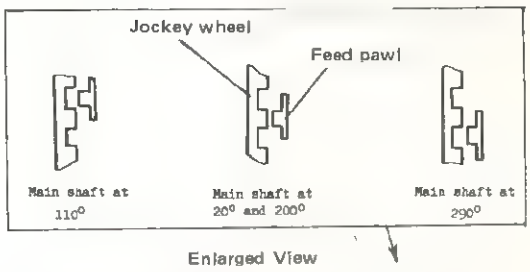


Fig. 4. 2b, Tape Feed Mechanism



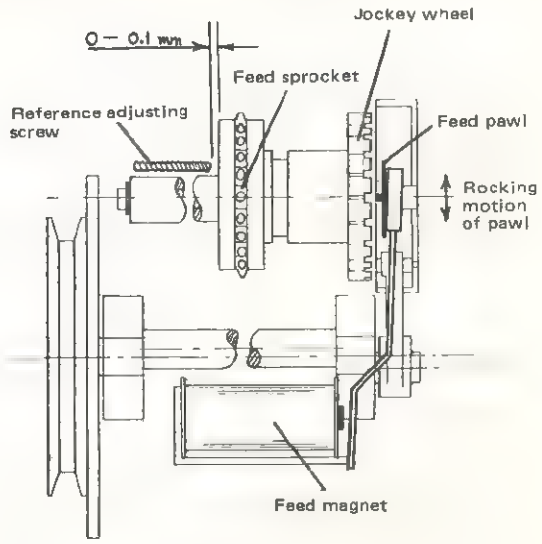


Fig. 4. 2c, Tape Feed Mechanism

4.1.5 Selector Box (See fig. 4.3)

The selector box houses 9 electro-magnets. When the appropriate electro-magnet is energized, the corresponding armature and interposer move forward approx. 1 mm. The interposer tip slides under the lower end of the punching needle so that when the punching bridge moves upward, driven by the main shaft, the needle follows the motion and pierces the tape. Those needles which have not been selected remain down. When the downward motion of the punching bridge begins, the selector magnets have been de-energized, and the interposers are retracted by their springs. The extractor engages with the cut-outs in the needles which had been selected and withdraws the needles.

Besides the selector magnets, the selector box also contains the reflective object sensor.

4.1.6 Punch Mechanism Timing

The mechanism is equipped with a photo-electric timing generator, the output of which is used to synchronize the data and tape feed pulses with the angular position of the shaft. The timing generator consists of a timing disc and reflective object sensor.

Fig. 4.4 shows the timing disc, which is on the back of the main shaft flywheel. Data signals to the selector box are applied throughout zones 5, 0 and 1. Feed forward occurs after data selection in zones 3, 4, 5 and 0. Back-space is 180^0 out of phase with feed forward and therefore occurs in zones 0, 1, 2 and 3.

The waveforms for the photo sensor output and magnet pulses are shown in fig. 4.5. Note that 0^0 in the mechanical cycle is defined when the main shaft's punch eccentric is at TDC (top dead center).

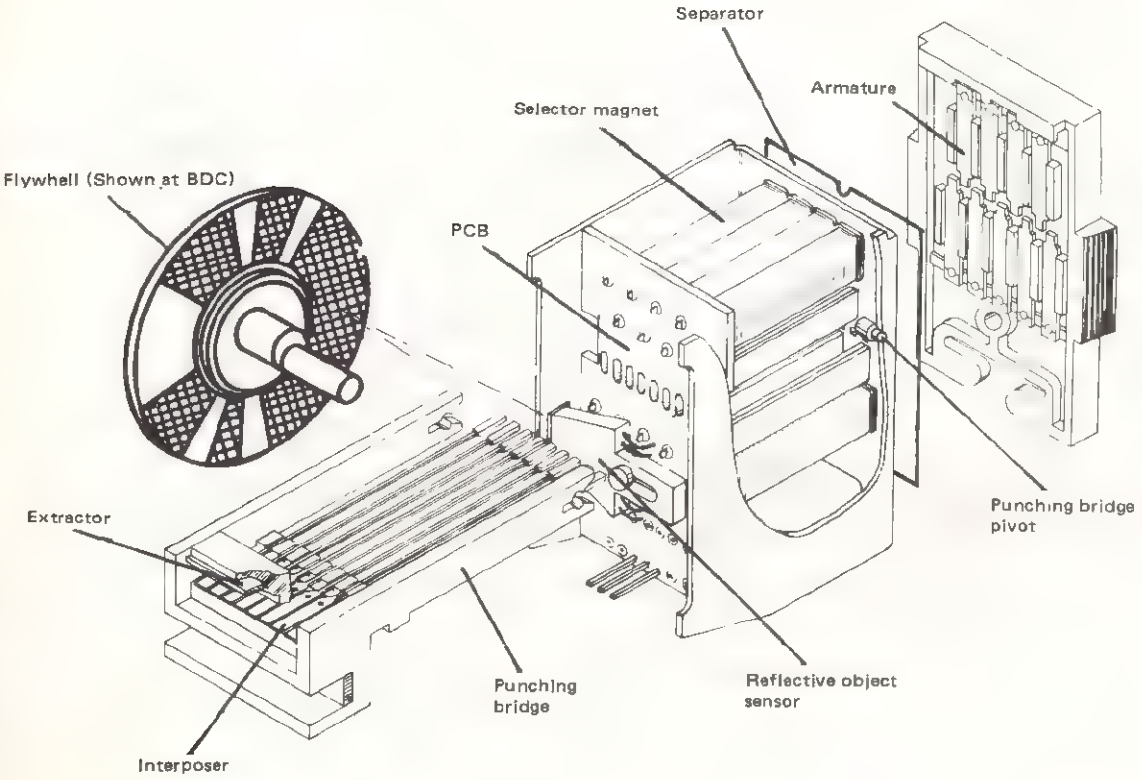


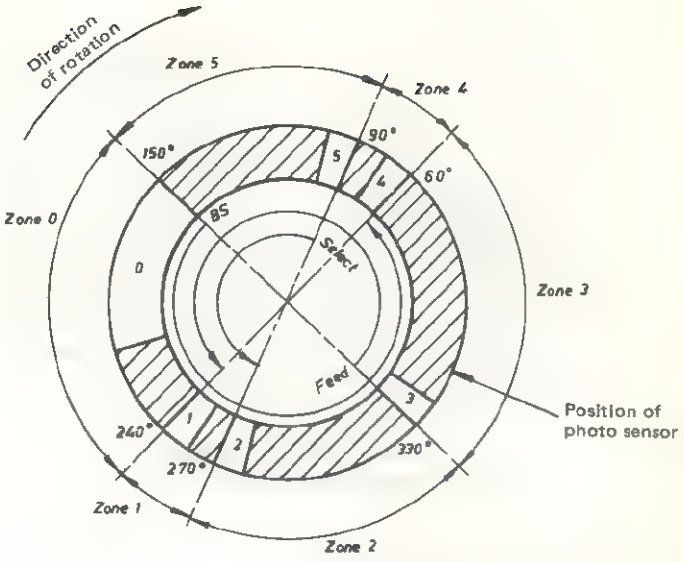
Fig. 4. 3, Selector Box

If all mechanical movements were instantaneous upon initiation of a control signal, the correct time for energizing the selector magnets would be at 180^0, and the correct time for de-energizing them would be at 0^0.

However, since the selector magnets have an activation time of approx. 4.5 ms, the selector pulse is applied at 90^0. The interposers will thus have moved forward by the time the main shaft has reached 180^0 (at a shaft speed of 3000 rmp, corresponding to 50 char./s). The selector pulse is removed at 270^0, but since the release time is approx. 5 ms, the interposers remain activated until the needles have pierced the tape.

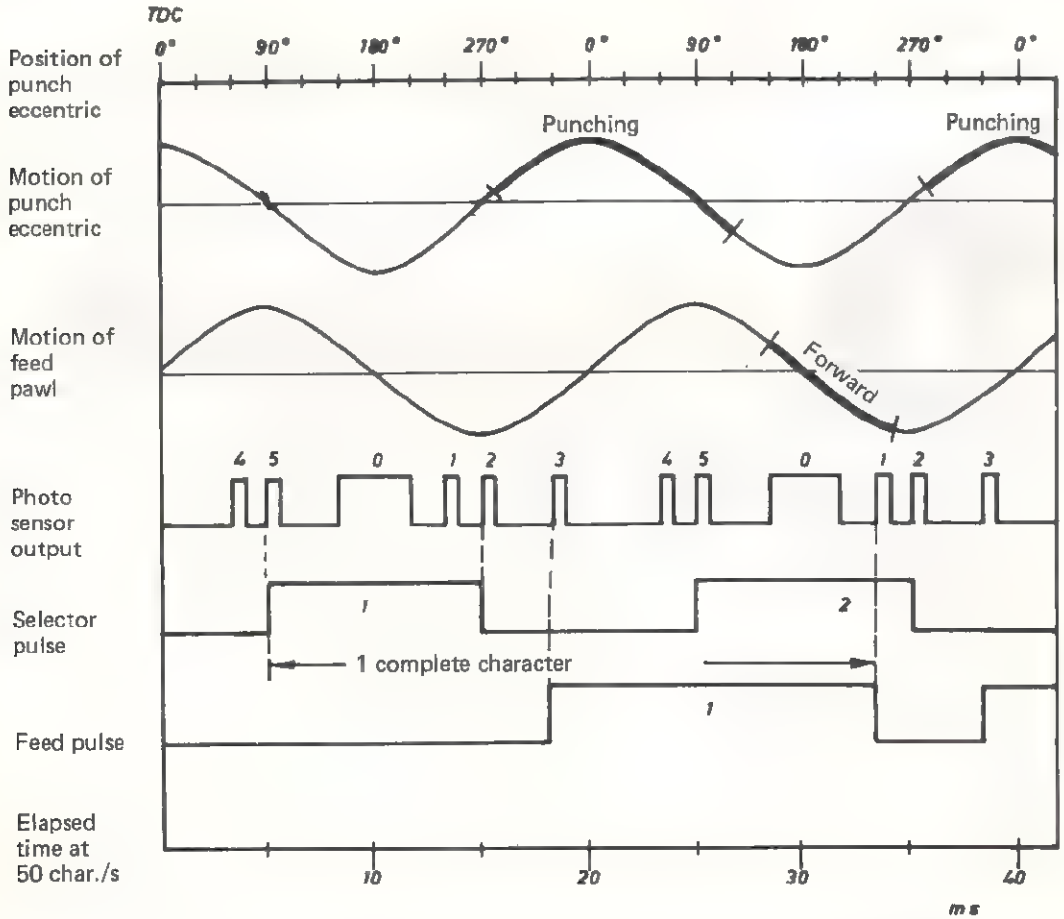
The tape feed magnet has an actuation time of approx. 4 ms. The feed magnet is energized at 330^0, the pawl is therefore engaged at the correct point, and the forward motion begins. The forward step is not complete until 290^0, but the pulse is removed at 240^0, thereby allowing for the release time and ensuring that tape movement and punching do not occur simultaneously.

A similar discussion applies to the back-space pulse, except that this is energized at 150^0 and removed at 60^0.



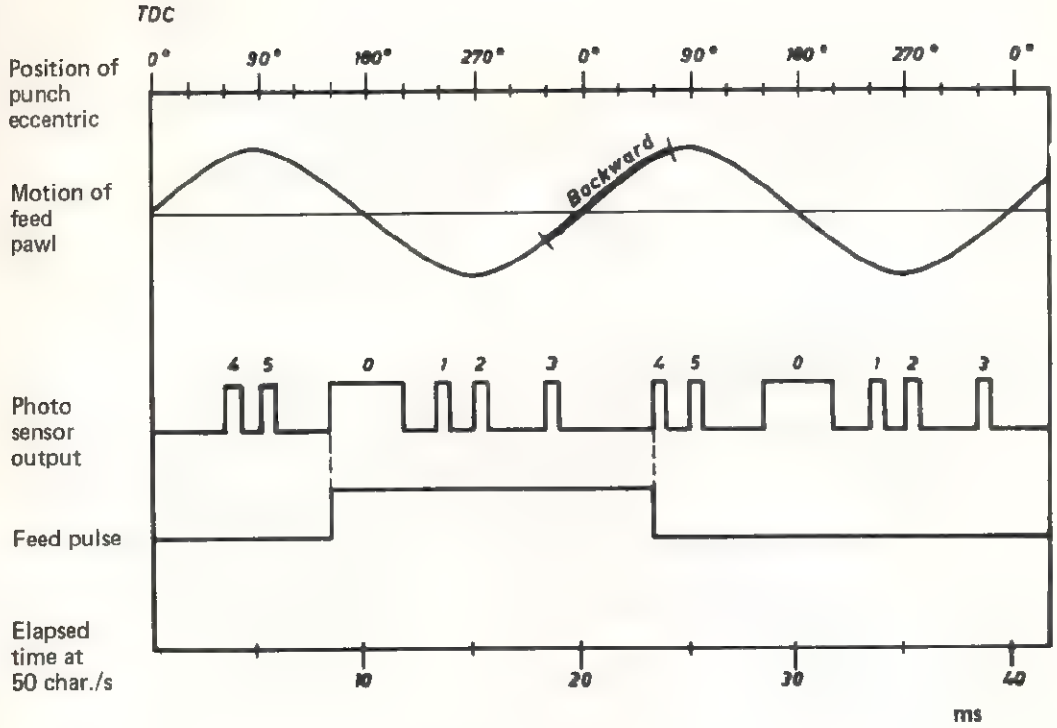
(Shown at the punch eccentric's TDC, as seen by the photo sensor. The unshaded area are reflective.)

Fig. 4. 4, Timing Disc



For the 75 char./s version, the photo sensor output is advanced 30^0, i. e. start of the selector pulse appears at 60^0, and the feed pulse at 300^0.

Fig. 4. 5a, Timing Diagram, Forward Step



For the 75 char./s version, the photo sensor output is advanced 30°, i.e. start of the back-space pulse appears at 120°.

Fig. 4. 5b, Timing Diagram, Backward Step

4.2 ELECTRICAL DESIGN

The logic circuit diagram is shown in fig. 4.8 The circuit is built up around Intel's 8748 or 8048 microprocessor. An SN 74LS244 is used as a receiver, and 2 SN 75468's are used as drivers. The components layout is shown in fig. 4.9 (a)).

The power supply is mounted on a separate pcb (see fig. 4.9 (b)).

The overall wiring diagram is shown in fig. 4.6.

The schematic for the power supply is shown in fig. 4.10.

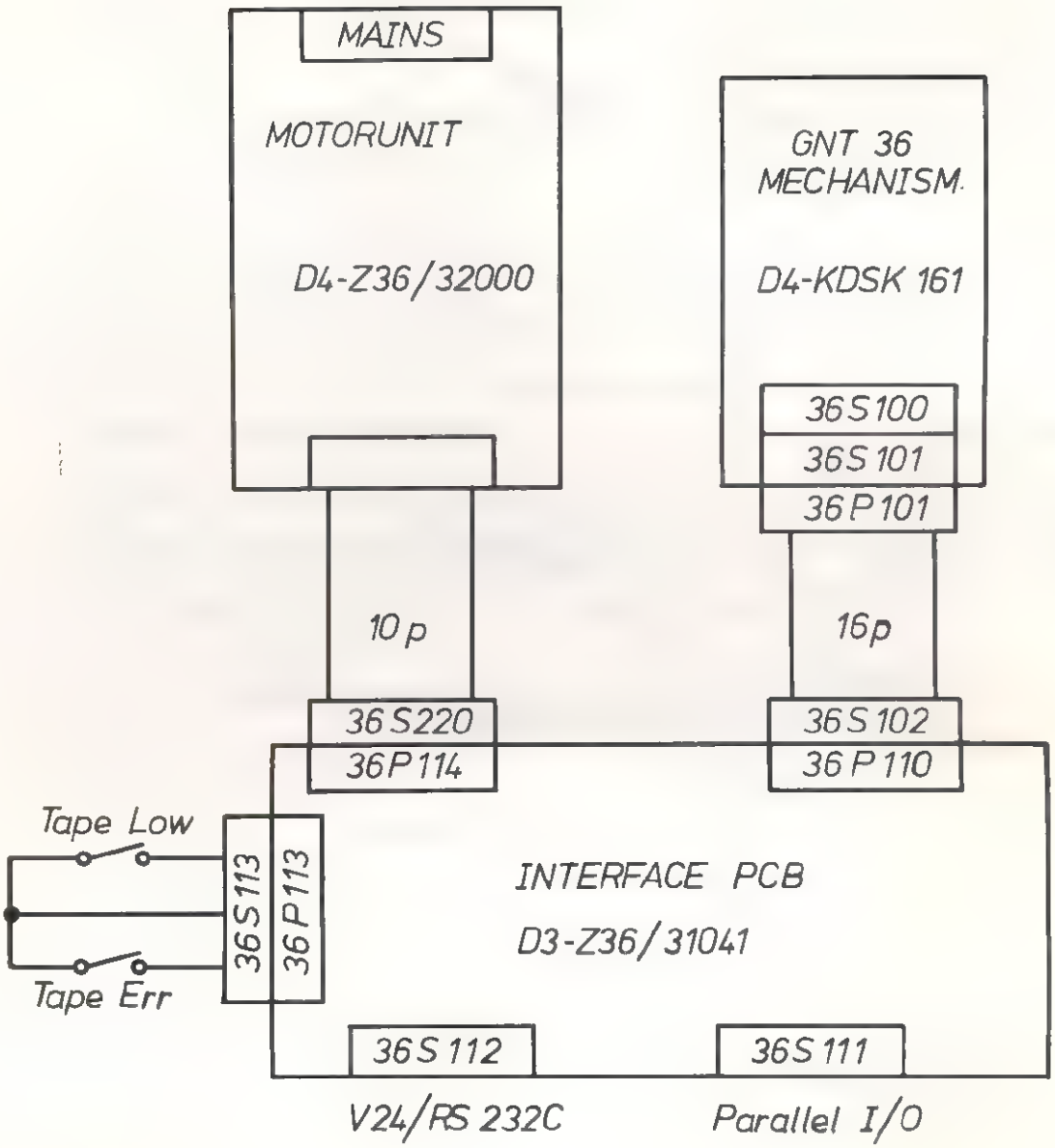
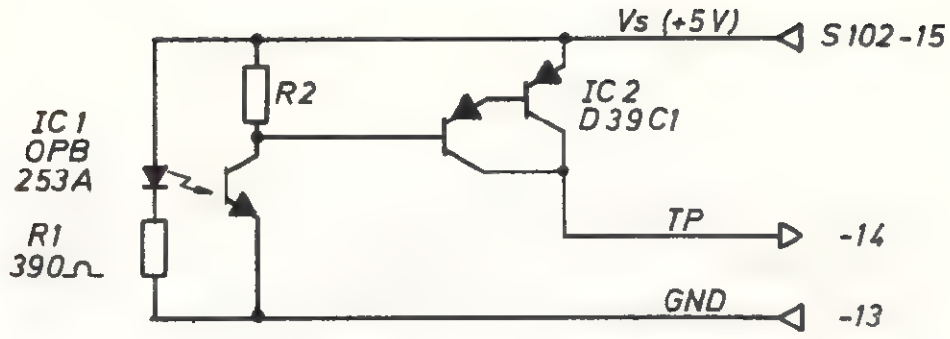


Fig. 4.6 Wiring Diagram



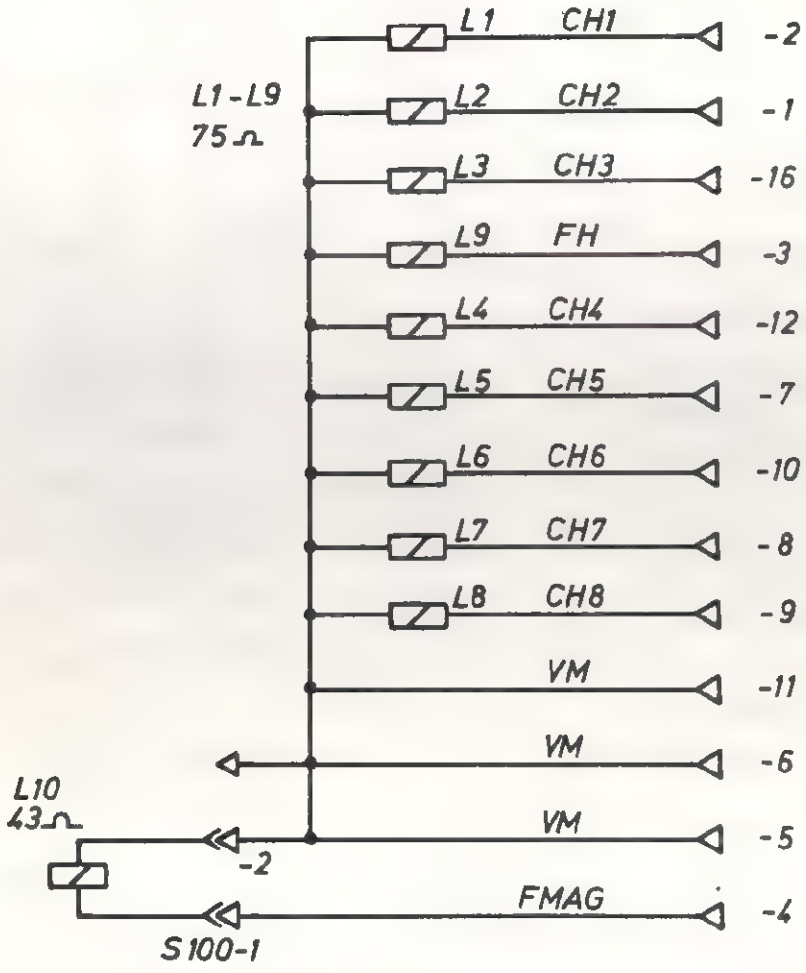
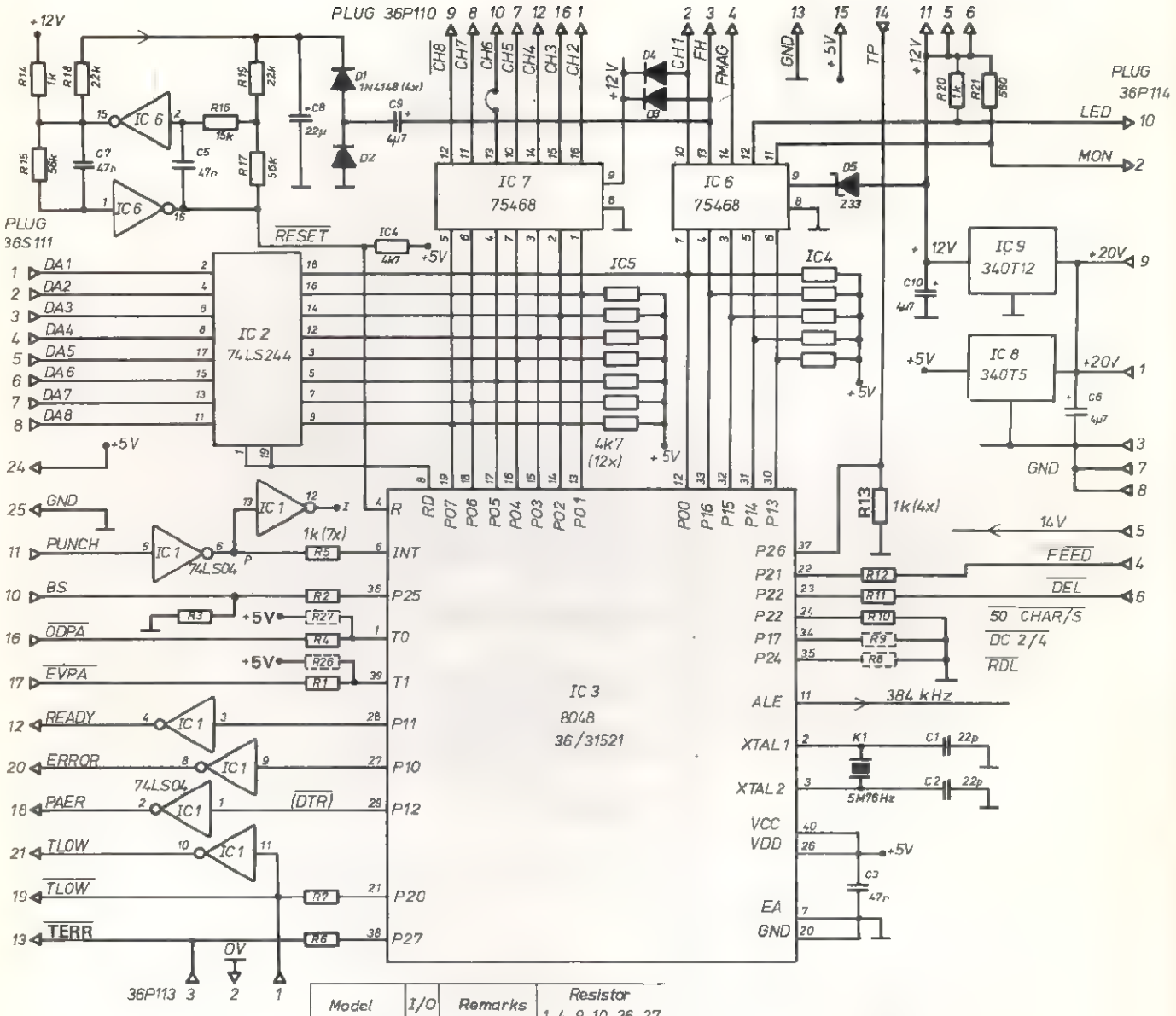


Fig. 4.7 Punch Mechanism Circuit Diagram



Model	I/O	Remarks	Resistor 1 4 9 10 26 27
Z36/31041	S/P	- DC 2/4	1k 1k
	S/P	+ DC 2/4	1k 1k 1k
Z36/31051	P	50 c/s	1k 1k 1k
	P	75 c/s	1k 1k

Fig. 4-8 Parallel Interface Circuit Diagram

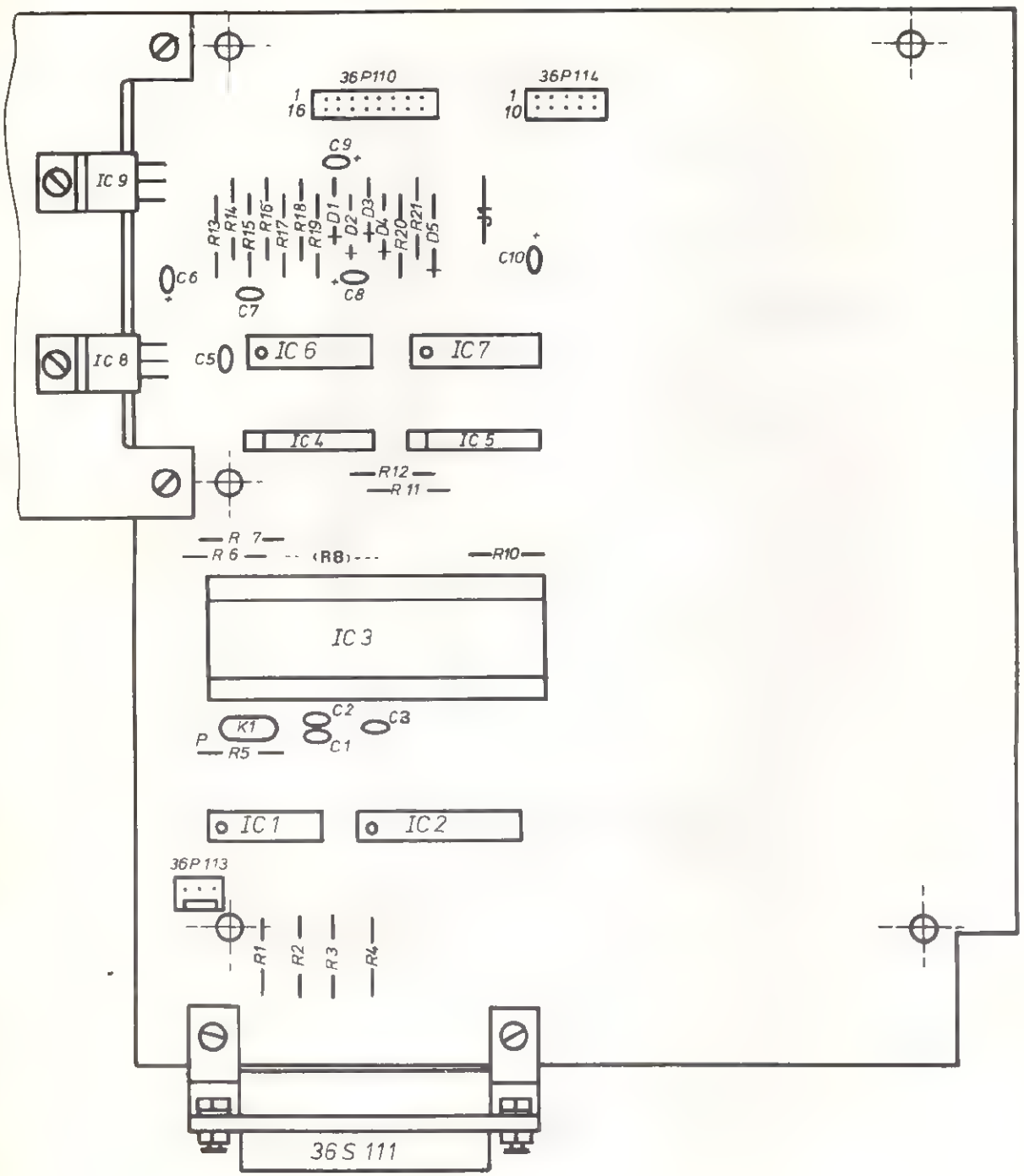


Fig. 4.9a Component Layout, Logic Board, Parallel Interface

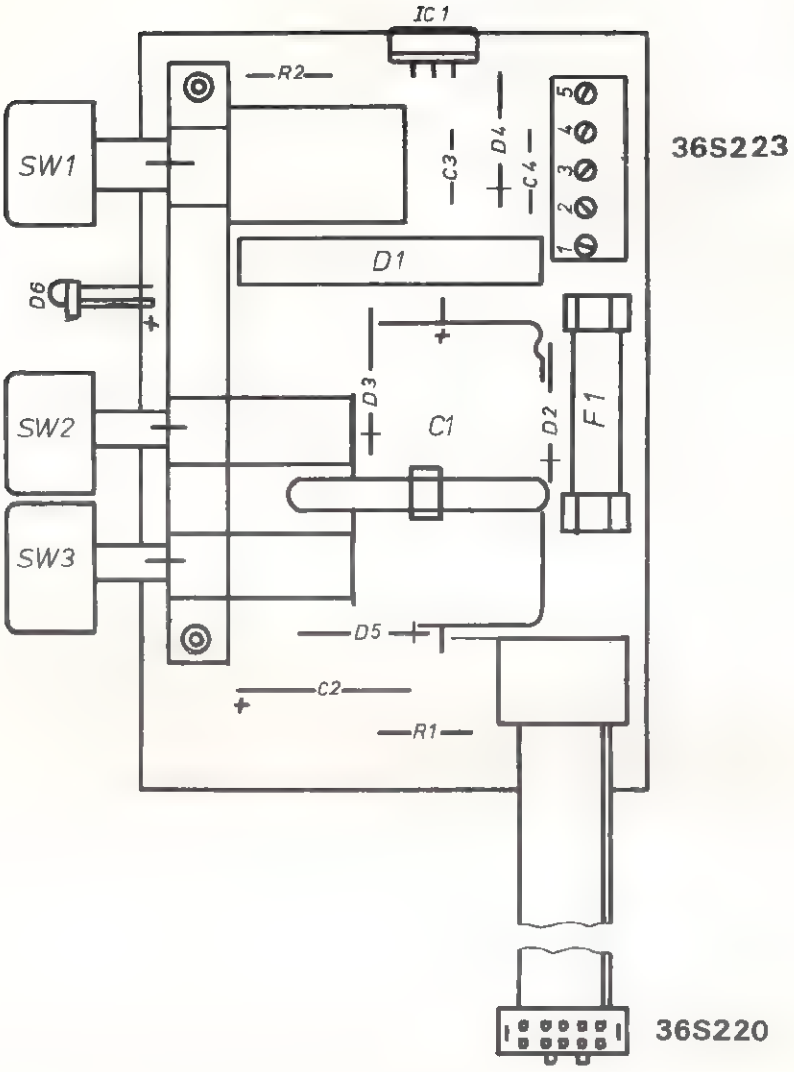


Fig. 4.9b, Component Layout, Power Supply and Control Panel

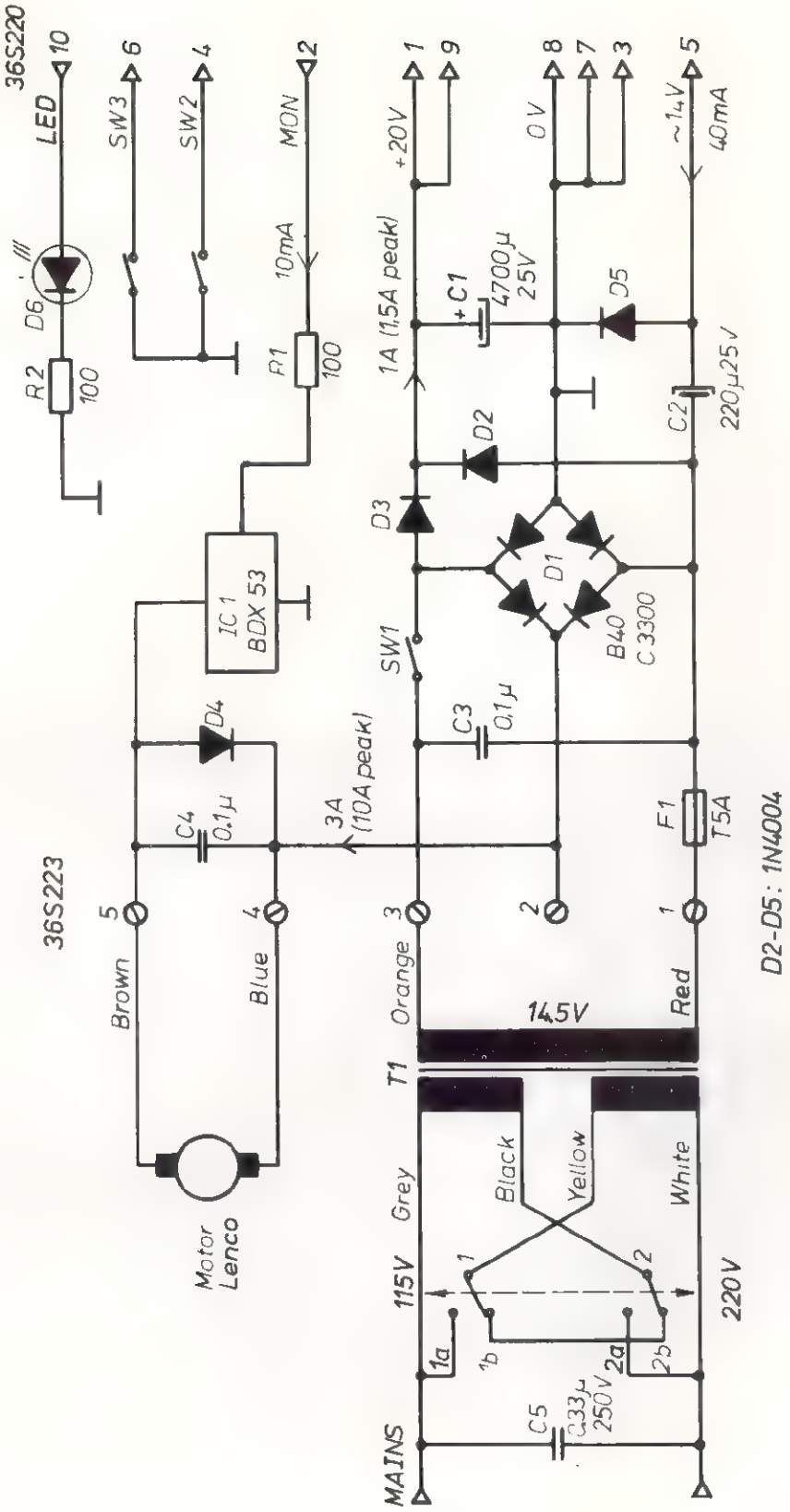


Fig. 4.10 Power Supply Schematic

SECTION 5

MAINTENANCE

5.1 DISMANTLING
(See the exploded views, figs. 7.1, 7.2)

5.1.1 Opening the Punch Station (fig. 5.1)

a) Unplug the A.C. power cord.

b) Shake any chad out of the chad chute into the chad box, and remove the chad box.

c) Turn the punch station over, and loosen the 5 screws which hold the top and base together.

d) Separate the top and base (see fig. 5.1).

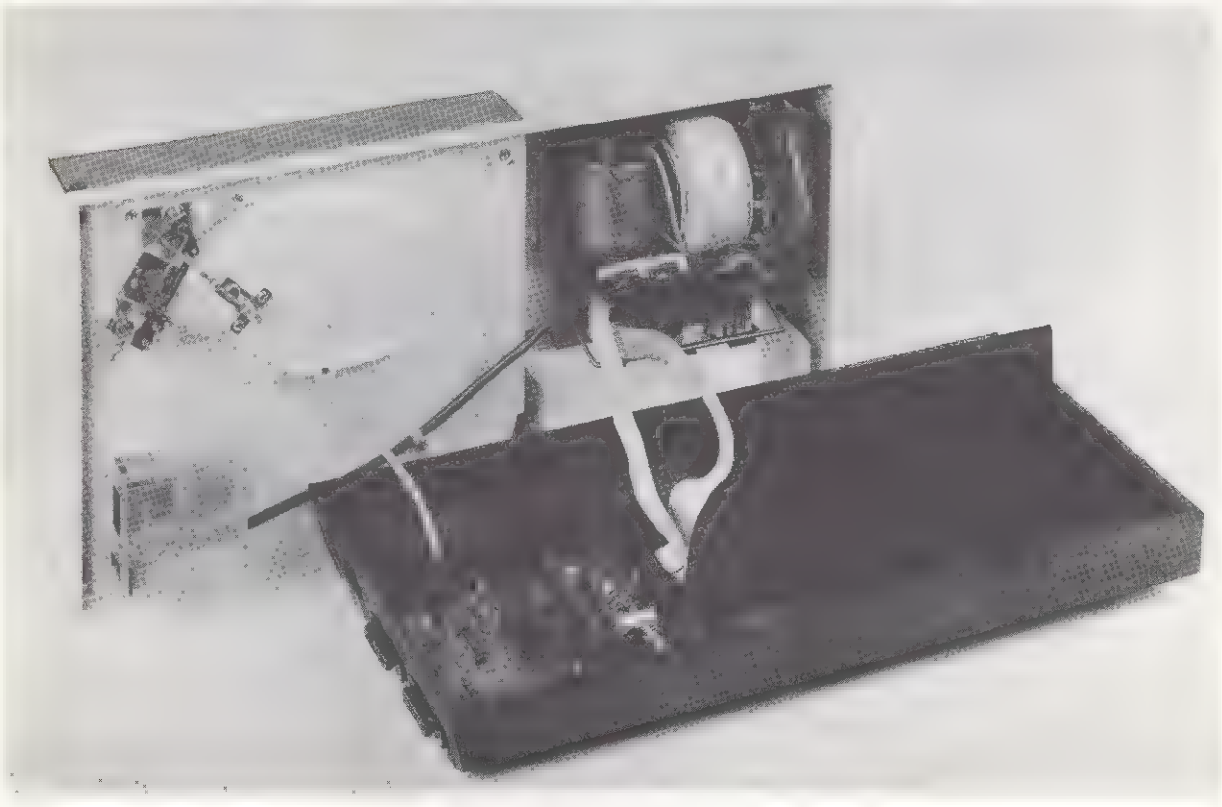


Fig. 5. 1, Opening the Punch Station

5.1.2 Removing the Punch Mechanism (fig. 5.2)

a) Open the punch station (section 5.1.1).

b) Unplug the punch mechanism's ribbon cable from the logic p.c.b.

c) Unsnap the clamp, and remove the drive belt and punch mechanism (see fig. 5.2).

d) To replace, clip the mounting clamp into the 2 holes in the mechanism's top cover brackets. Be sure the flats on the rubber pads are turned towards the mounting surface. Twist the 2 pads so that the mechanism is held fast.

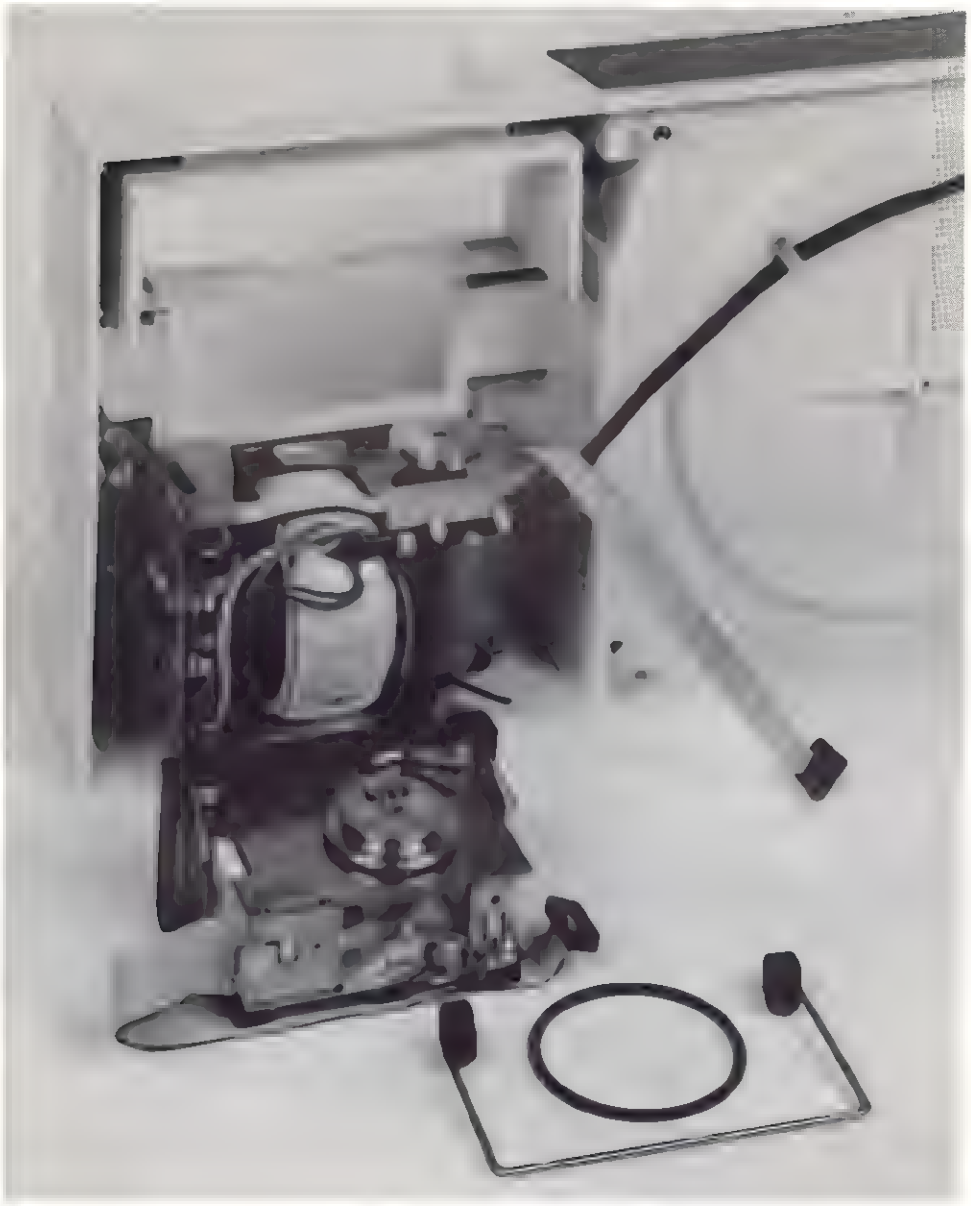


Fig. 5. 2 Removing the Punch Mechanism

5.1.3 Removing the Motor and Power Supply Unit and also the Logic P.C.B. (See fig. 5.3)

a) Open the punch station (section 5.1.1).

b) Remove the 3 screws which hold the A.C. power input cover.

c) Unplug the ribbon cable which connects the power supply board to the logic board.

d) Remove the screw which hold the A.C. power cable.

e) Remove the drive belt.

f) Remove the 4 screws which hold the unit and lift it out.

g) The logic p.c.b. can be lifted out after removing the screws which fasten it to the base.

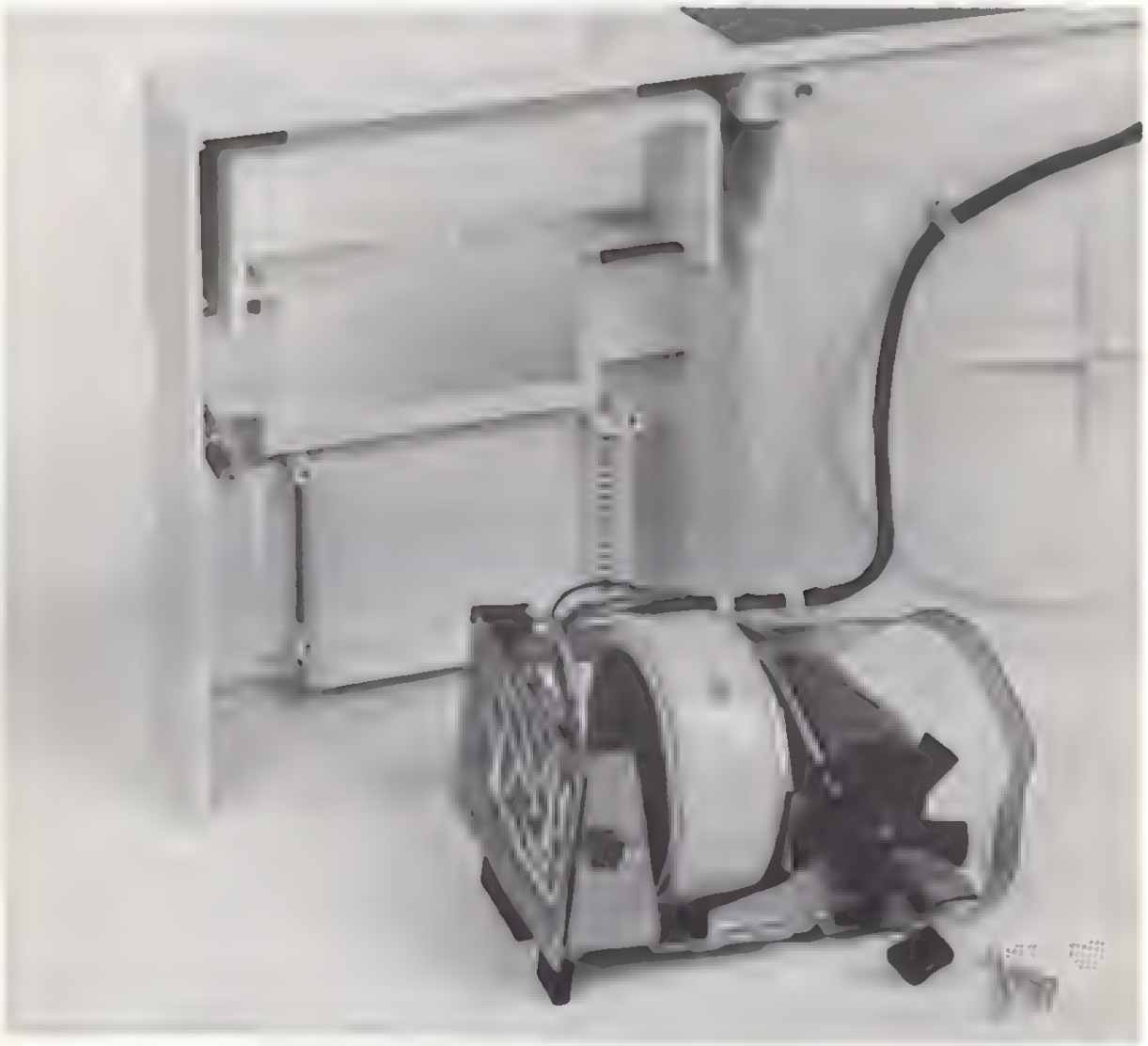


Fig. 5. 3, Removing the Motor and Power Supply Unit

5.1.4 Removing the Punch Mechanism's Top Cover (See fig. 5.4)

a) Remove the punch mechanism (see section 5.1.2).

b) Pull outwards on the tab at the rear of the mechanism.

c) Lift out the cover.

d) When fitting a new top cover (see section 5.1.18 (d).

5.1.5 Removing the Selector Box (See fig. 5.5)

a) Remove the top cover (see section 5.1.4).

b) Grasp the selector box by its two serrated tabs (fig. 5.4), and slide it out while depressing the locking clip.

5.1.6 Removing the Punch Set (See fig. 7.4)

a) Remove the selector box (see section 5.1.5).

b) Unscrew the two screws which hold the die block.

c) Lift out the punch set.

5.1.7 Removing the Tape Feed Magnet (See Fig. 5.5)

a) Remove the mechanism (see section 5.1.2).

b) Lift the locking clip on the bottom of the mechanism, and unplug the connector.

c) Press the locking tab on the magnet bracket so that the magnet unit is freed.

d) Slide the unit out of the chassis.

Reassembly

e) To replace, merely snap the unit into place.

f) Be sure to insert the plug with the rectangular openings towards the locking clip.

5.1.8 Removing the Main Shaft (See fig. 7.4)

a) Remove the punch set (see section 5.1.6).

b) Press the shaft out.

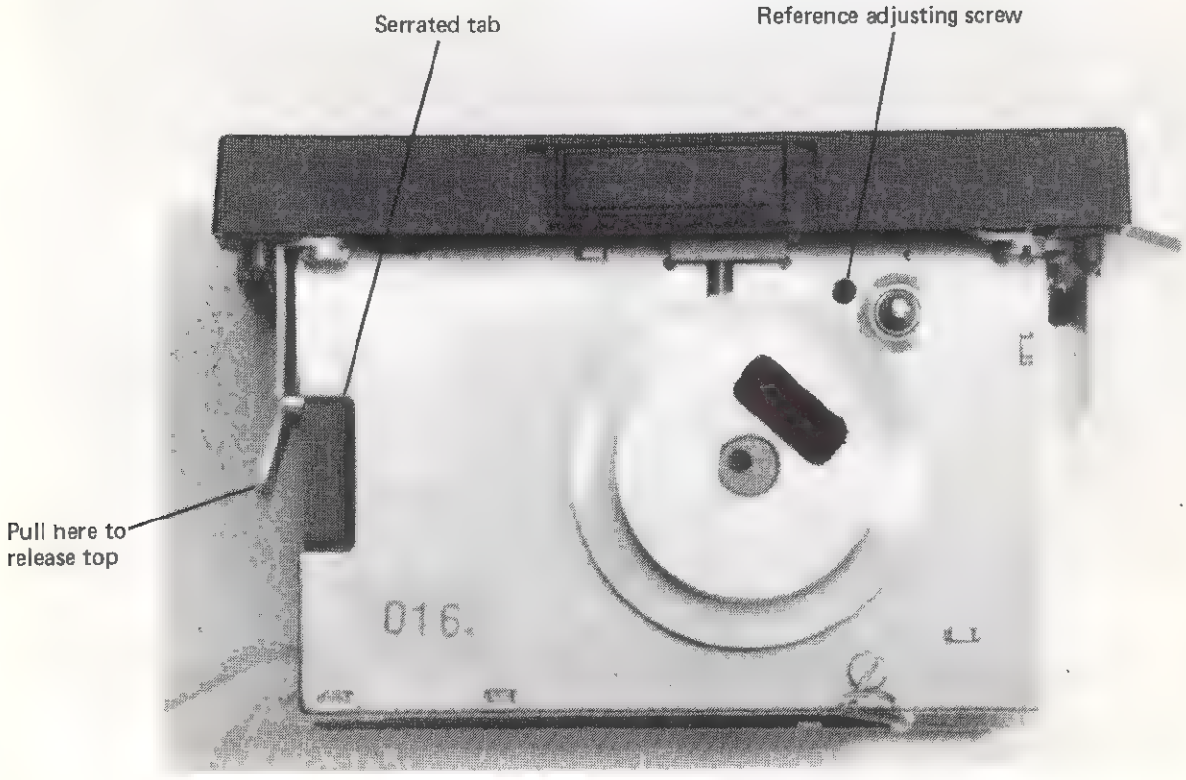


Fig. 5. 4, Removing the Punch Mechanism's Top Cover

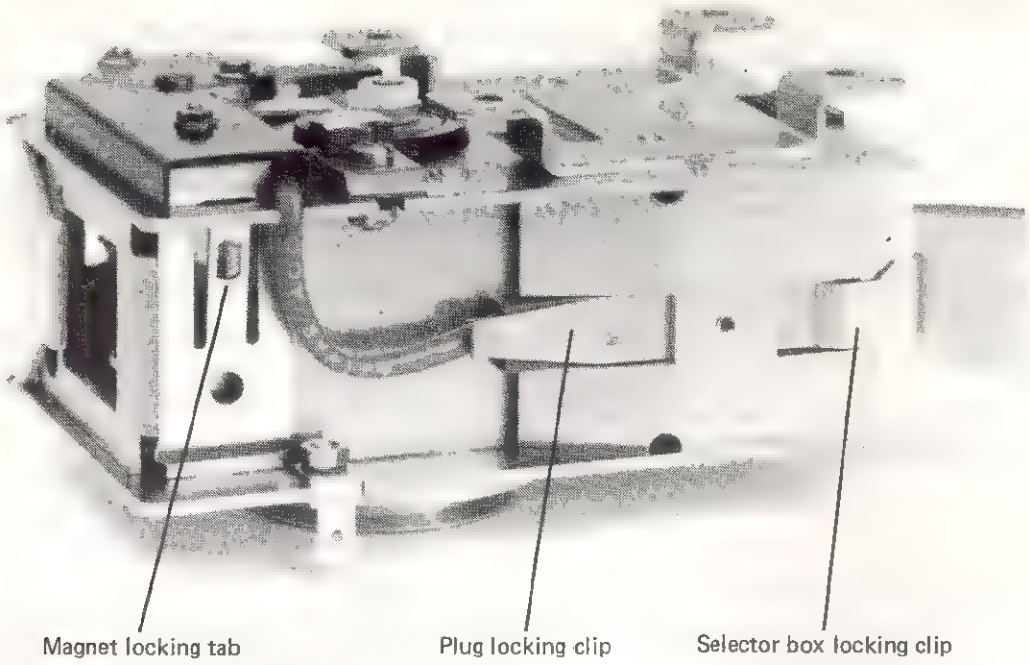


Fig. 5. 5, Dismantling the GNT 36 Punch Mechanism

5.1.9 Removing the Dog Clutch (See fig. 7.4)*

a) Remove the top cover (section 5.1.4).

b) Remove the tape feed magnet (section 5.1.7).

c) Loosen the reference locking screw (fig. 5.7 (b)).

d) Slide out the clutch unit.

5.1.10 Removing the Tape Feed Wheel (See fig. 7.4)*

a) Remove the dog clutch (see section 5.1.9).

b) Unsnap the tape guide plate, and rotate it upwards.

c) Hold the jockey arm out of the way, and withdraw the feed wheel (see also fig. 4.2).

5.1.11 Removing the Jockey Arm Spring (See fig. 7.4)

a) Remove the tape feed wheel (section 5.1.10).

b) Unhook the spring from its mooring on the chassis, and slide the spring off the arm.

* When reassembling, ensure that there is 0.1 mm between the feed wheel and the reference adjusting screw (see section 5.2.5 (c)).

5.1.12 Removing the Jockey Arm (See Fig. 7.4)

a) Remove the jockey spring (section 5.1.11).

b) Loosen the pitch locking screw (fig. 5.7 (a)).

c) Turn the eccentric hex nut so that the arm is free.

d) Slide the arm out.

NB: After reassembly, the pitch adjustment procedure must be carried out (section 5.2.2) (see also section 5.2.5 (c)).

5.1.13 Removing the Punching Bridge (See fig. 7.4)

a) Remove the selector box (section 5.1.5).

b) Grasp the punching bridge with thumb and forefinger, and pull it out.

Reassembly

c) To replace, carefully insert the interposers into the slots in the p.c.b., and snap the bridge into place.

5.1.14 Removing the Reflective Object Sensor (See figs. 7.4 & 4.3)

a) Remove the punching bridge (section 5.1.13).

b) Loosen (do not remove) the 4 screws which hold the shield plate, and remove the plate.

c) Undo the nut which holds the sensor unit, and lift the unit to give access to the leads.

d) Unsolder the leads, noting their position.

Reassembly

e) When replacing, adjust the sensor unit so that the face is flush with the selector box housing.

5.1.15 Replacing the Signal Cable

a) Remove the selector box (section 5.1.5).

b) Remove the cable clamping yoke.

c) Pinch the cable and free it from the slot.

d) Unplug the connector.

Reassembly

e) When replacing the cable, be sure that pin No. 1 is located adjacent to the milled edge on the selector box receptacle.

5.1.16 Removing the Tape Guide Cover (See fig. 7.4)

a) Remove the punch set (see section 5.1.6).

b) Slide the cover into the opening left by the die block.

c) Lift out the cover.

Note that the tape guide springs fall out when the cover is removed. Be sure to replace them correctly as shown in fig. 3.3

5.1.17 Removing the Tape Guide Plate (See fig. 7.4)

a) Remove the punch set (section 5.1.6).

b) Unsnap the forward end of the guide plate.

c) Lift out the guide plate.

5.1.18 Removing the Thrust Pad (See fig. 7.5)

a) Remove the top cover (section 5.1.4).

b) Depress the latch so that the window pops up.

c) Unclip the thrust pad.

d) When fitting a new thrust pad, check the clearance between the thrust pad and the sprocket wheel hub (fig. 5.6) as follows:

1. Open the pop-up window.
2. Insert a strip of paper tape, 5 x 70 mm, into the slot beneath the tear-off tip so that it rests on the sprocket wheel hub with its edge against the sprockets.
3. Close the window, and check that the paper can move freely.
4. Repeat steps 1-3 with the paper on the other side of the sprockets.
5. Repeat the test (steps 1-4) with 3 layers of paper, and check that in this case the strips are clamped tightly between the thrust pad and the hub.
6. If the above conditions are not met, remove the thrust pad, and bend it.

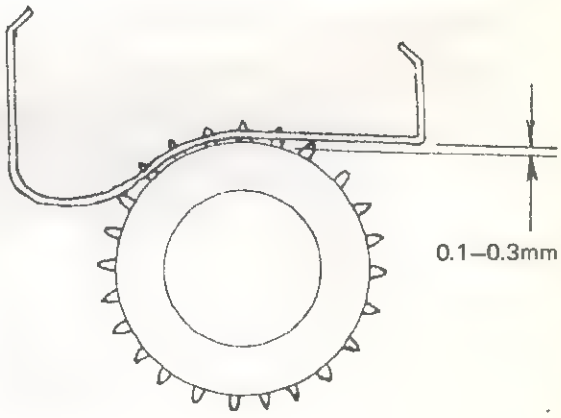


Fig. 5.6, Thrust Pad Clearance

5.1.19 Removing the Pop-Up Window (fig. 7.5)

a) Remove the top cover (section 5.1.4).

b) Unscrew the 2 screws which hold the forward bracket.

c) Remove the pop-up window and thrust pad.

d) Unclip the thrust pad.

5.1.20 Removing the Clutch Mechanism Unit (fig. 5.7b)

a) Remove the top cover (section 5.1.4).

b) Remove the tape feed magnet (section 5.1.7).

c) Loosen the reference locking screw.

d) Lift out the clutch mechanism.

5.2 ADJUSTMENTS - PUNCH MECHANISM

5.2.1 General

Normally, no adjustments are necessary. However, if a part has been replaced, the adjustments should be checked. The punching mechanism must be removed before the adjustments can be made (see section 5.1.2). The adjustments should be carried out in the order given.

5.2.2 Pitch (Jockey Arm)

a) Clean the die block, so that no chad are in holes 1 and 8.

b) Insert a piece of correctly punched tape into the mechanism so that holes 1 and 8 are visible in the die block.

c) Maintaining a light backwards tension on the tape, turn the pitch eccentric on the side of the punch until the holes are aligned (see fig. 5.7a). NB: for ISO punch sets, the eccentric should be at approx. 9 o'clock, for TTS, 11 o'clock.

d) Carry out the pawl adjustment, section 5.2.3.

e) After the pawl adjustment has been carried out, the final pitch adjustment is made by punching a piece of tape and checking it against a pitch gauge. Alternatively, measure the distance, center-to-center across 51 feed holes (50 pitches). The distance should be 127.0 mm ± 0.6 mm. If the tape has been punched with no tape drag, the distance should be near the maximum.

f) Finally, recheck the pawl adjustment.

5.2.3 Pawl Adjustment

a) Loosen the locking screw (see fig. 5.7a).

b) If necessary, a rough adjustment can be made by holding the pawl in engagement and rotating the flywheel. Set the adjusting screw so that the jockey roller moves symmetrically to and fro across one tooth of the jockey gear (i.e. from one "valley" to another) (see fig. 4.2).

c) The final adjustment is made by holding the pawl in and rotating the flywheel. At both ends of the pawl travel, there should be a "dead" angle of at least 50^0 (measured on the flywheel) where the feed sprocket does not move.

d) Tighten the locking screw.

5.2.4 Feed Magnet Adjustment

a) Apply 12 V DC between pin 4 and pin 6 (plug 36 P 110). Be sure that the feed pawl engages one of the radial slots on the side of the jockey wheel.

b) Adjust the nut (fig. 5.7a), so that the feed pawl is touching the face of the jockey wheel. Then turn the adjusting nut another 1/4 turn clockwise.

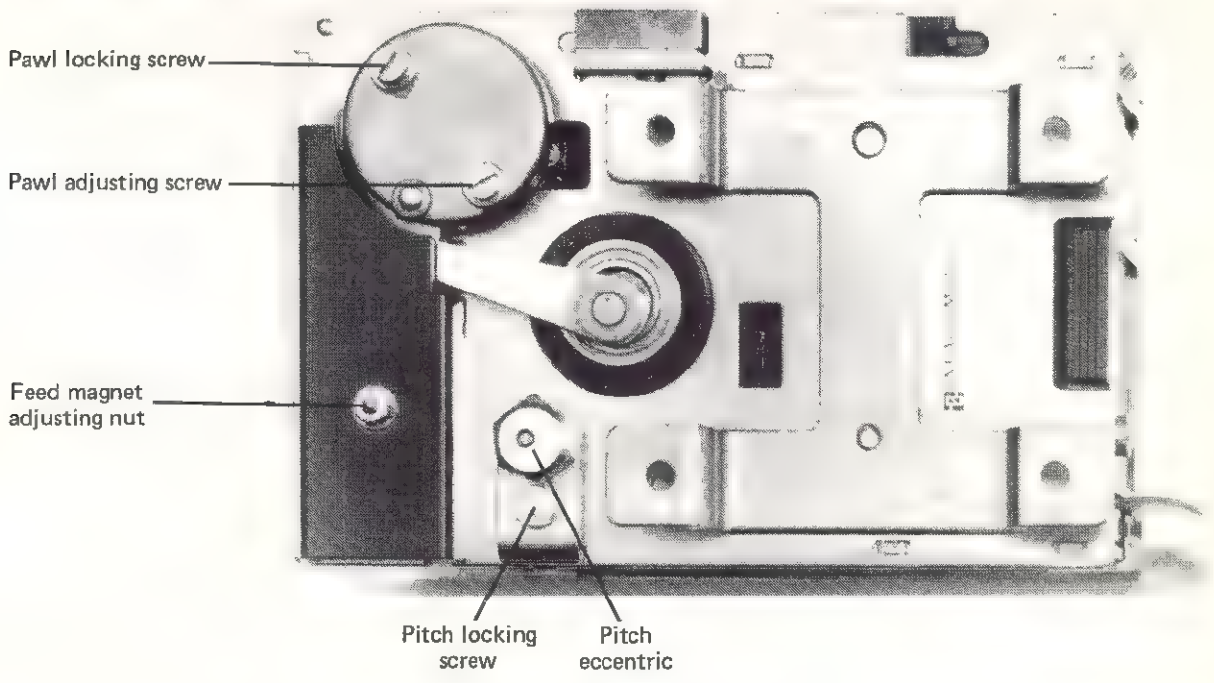


Fig. 5.7a, Adjustments

5.2.5 Reference Adjustment

a) The distance from the reference edge of the tape to the center of the feed hole should be 9.96 mm ± 0.1 mm (for TTS, JIS: 11.2 mm ± 0.1 mm). If not, loosen the reference locking screw (fig. 5.4) and insert a 1 1/2 mm allen wrench into the adjustment hole.

b) To increase the reference distance, turn the screw clockwise and vice versa.

c) Set the tubular axle so there is 0.1 mm between the feed wheel and the adjusting screw (see fig. 4.2c).

d) Tighten the reference locking screw (fig. 5.7b).

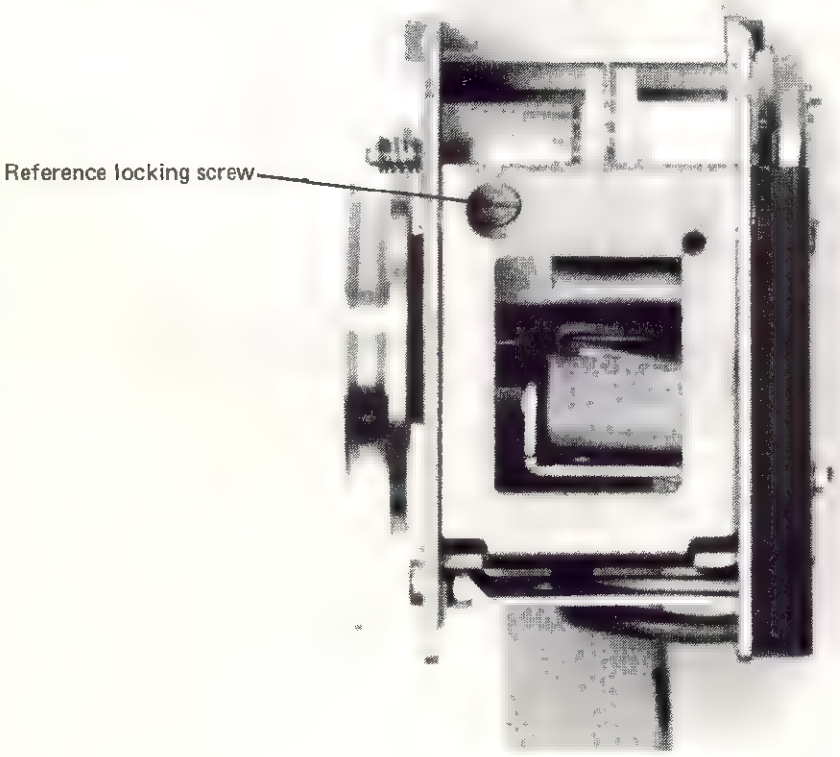


Fig. 5.7b, Adjustments

5.3 ADJUSTMENTS - TAPE HANDLER (See fig.5.8)

5.3.1 General

The tape handler is factory adjusted. If, however, a part has been replaced or some malfunction develops, adjustment may be necessary.

Open the punch station as described in section 5.1.1, and proceed as follows:

5.3.2 Tension Arm (Tape Out, Taut Tape)

Both tape out and taut tape are indicated by one double-actuated microswitch. Tape out is activated when there is no tape passing through the tension arm roller unit.

To check this function, hold the roller unit parallel to the cabinet, and allow it to move towards the cabinet. At a distance of 3-5 mm, the click of the microswitch should be heard. If not, turn nut A (fig. 5.8) to achieve the correct actuation point.

Taut tape is activated when the roller unit is 76-80 mm from the cabinet. This adjustment is made by nut B.

5.3.3 Turntable Brake

Check the brake by holding the tension arm away from the cabinet and giving the turntable a spin. Slowly let the arm move back, and note the point at which braking occurs. The distance to the edge of the cabinet should be 12.5-16.5 mm. If not, adjust nut C.

5.3.4 Tape Low Arm

The tape low microswitch should activate when 10-25 meters of tape are left on the roll. This can be checked by allowing the tape low arm to swing in towards the turntable hub. When the tip of the arm is 9-15 mm from the hub, a distinct click should be heard. If not, the arm must be adjusted by loosening cam set-screw D, rotating the cam slightly and retightening.

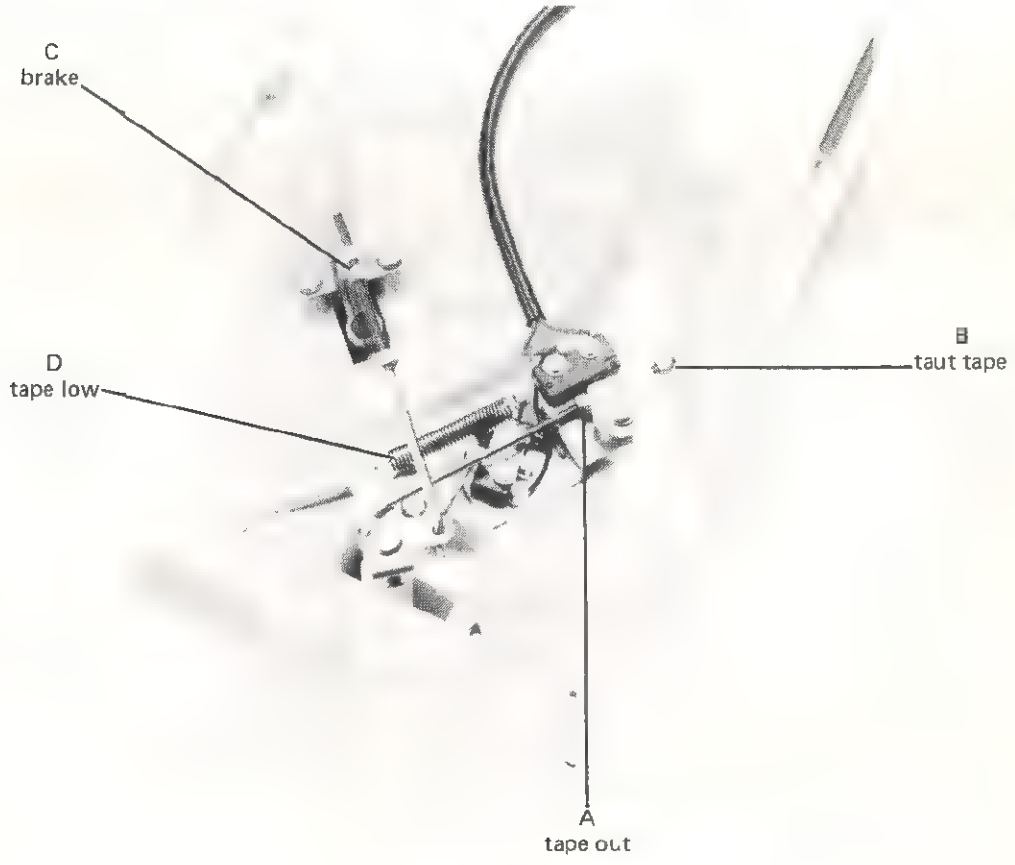


Fig. 5.8, Tape Handler Adjustments

SECTION 6

TROUBLE SHOOTING

SYMPTOM	POSSIBLE CAUSE
LED does not light, motor does not start when TF is depressed	AC fuse blown Defective power switch DC fuse blown Power supply defective
LED lights, motor does not start when TF is depressed	Motor disconnected Motor driver defective or other fault on logic p.c.b.
LED lights, motor starts when TF is depressed, but no tape feed occurs	Fault on logic p.c.b. Defective feed magnet Punch mechanism out of adjustment
Motor speeds up at Power On	Drive belt slipping or missing Punch mechanism flat cable disconnected
LED blinks, punching disabled	Constant tape out condition due to incorrect adjustment
LED lights, TF and Delete operate, but no code holes are punched	Fault on logic p.c.b.
Code holes punched, but incorrectly	Incorrect signal connection (see section 2.6 or 8.2) Defective selector box Defective punch set Fault on logic p.c.b.
Damaged feed holes	Too much drag from tape dispenser (brake adjustment faulty) Thrust pad defective
Incorrect pitch	Tape dispenser dragging Pitch adjustment incorrect Thrust pad defective

SECTION 7

PARTS LIST

7.1 GNT 3601 PUNCH STATION (See figs. 7.1, 7.2, 7.3)

Number of spare parts suggested for:

A - 1 to 20 units
B - 21 to 60 units
C - 61 to 120 units
D - for more than 120 units

Ref. No.	Part No.	Part Name	Stock Ref. A	B	C	D
	36/32200	Punch Station Hardware Kit (contents marked with plus those with alphanumeric reference, e.g. S1, C2)	1	1	2	4
2	MY4-52833	Bearing, turntable★				
3	34/1618	Nylon washer★				
4	34/51250	Rubber foot★				
5	34/51530	Actuating block★				
6	36/30320	Brake arm★		1	2	2
7	34/51570	Brake arm bracket		1	2	2
7a	34/60750	Pin for brake arm★				
8	36/30350	Lever arm				1
9	Z36/12310	Selector cable				
10	36/20300	Chad box		1	2	2
12	34/1282	Drive belt★				
21	Z36/30010	Top cover			1	2
22	36/30030	Base			1	2
23	36/30040	Lid		1	2	2
24	36/30050	Turntable			1	2
25	36/30060	Blanking plate		2	4	6
26	Z36/30070	Tension arm unit		1	2	4
28	36/30450	Lid bearing				
30	36/30190	Collar★				
31	36/30200	Bracket				1
32	Z36/30210	Tape guide and roller		1	2	4
33	36/30220	Tape low cam				1
35 a	36/30250	Transparent disc				
36	36/30260	Felt pad★				
	36/10351	Damper★				

Ref. No.	Part No.	Part Name	Stock Ref. A	B	C	D
37	36/30270	Spacer				1
38	36/30280	Arm			1	2
39	36/30290	Rubber brake pad*				
40	36/30300	Collar, tension arm*				
42	36/30330	Leaf spring			2	4
43	36/30340	Blanking plate				
44	36/30360	Nylon washer*				
45	36/30370	Nylon washer*				
46	36/30380	ID-plate				
47	36/30390	Symbols				
48	36/32190	A.C. cover				
49	36/30420	Spring*				
51	Z36/31040	Parallel/serial interface	1	2	2	4
	Z36/31050	Parallel interface	1	2	2	4
	Z36/31200	Reversing plug				
51b	Z36/31520	Microprocessor	1	2	2	4
52	Z36/31410	Cable set (other cables not shown)		1	1	2
53	36/30600	Spring				
54	MY7-51359	Cable clamp (small)				
55	MY7-21868	Cable clamp				
56	MY2-52839	C-unit	6	6	12	12
57	MY7-52744	Voltage switch		1	2	4
58	MY7-52574	AC power socket		1	4	4
58a	MY7-51748	AC power plug			2	2
58b	MY4-52709	Terminal for 58	1	4	4	8
59	MZ7-51380	Microswitch	1	4	4	8
60	MZ7-51381	Microswitch activator*				
61	KDSK-16107	Punch mechanism ISO, 50 char./s	1	1	2	4
	KDSK-16108	Punch mechanism TTS, 50 char./s	1	1	2	4
	KDSK-16111	Punch mechanism ISO, 75 char./s	1	1	2	4
	KDSK-16112	Punch mechanism TTS, 75 char./s	1	1	2	4
62	Z36/32000	Motor and power supply unit, 115 V/230 V				
63	36/3023	Tape low arm				
64	36/30240	Axle tape low				
	MY2-52550	Fuse 5A				

7.2 GNT 36 PUNCH MECHANISM (See figs. 7.4, 7.5)

Ref. No.	Part No.	Part Name	Stock Ref. A	B	C	D
1	Z36/10010	Main Frame				
2	36/10140	Screw, Allen		2	4	4
3	36/10170	Pitch eccentric			4	4
4	36/10180	Jockey spring		4	8	8
5	36/10190	Clamp for 36/10170		2	4	4
6	Z36/11700	Jockey arm, unit		1	4	4
7	Z36/11850	Main shaft, 50 char./s, 6-winged	1	2	4	8
	Z36/11860	Main shaft, 75 char./s, 6-winged	1	2	4	8
8	Z36/10370	Punch set, ISO		2	4	4
	Z36/10450	Punch set, TTS		2	4	4
9	36/10420	Nut, for punch set	2	6	10	10
10	36/10430	Tape guide cover		2	4	4
11	36/10440	Tape guide spring		4	8	8
12	36/10460	Clamping ring for feed axle		2	4	6
13	36/10470	Tape guide plate		2	4	6
14	36/10490	Tape feed wheel	1	4	10	10
15	Z36/10590	Clutch mechanism, unit	1	4	8	12
16	36/10690	Connecting rod		2	4	4
17	Z36/10700	Tape feed magnet, unit	1	2	6	8
18	Z36/10840	Top cover, unit	1	2	6	8
	Z36/10890	Top cover, stripped				
	36/10930	Chad diverter				
	36/10940	Blanking plate				
	36/10950	Pop-up window				
	36/10960	Thrust pad				
19	36/10980	GNT 36 I.D. plate				
23	36/11430	Cable clamping yoke				
24	Z36/12310	Signal cable				
25	36/11480	Mounting clamp				
26	36/11490	Rubber mounting pad				
20 22	Z36/12020	Selector box unit, 50 char./s				
20 22	Z36/12050	Selector box unit, 75 char./s				

Part of 10840, see fig. 7.5

C2 SCM 11207
S11 MY4-51532 6 x 5/16"
S14 MY4-52380 3 x 6"

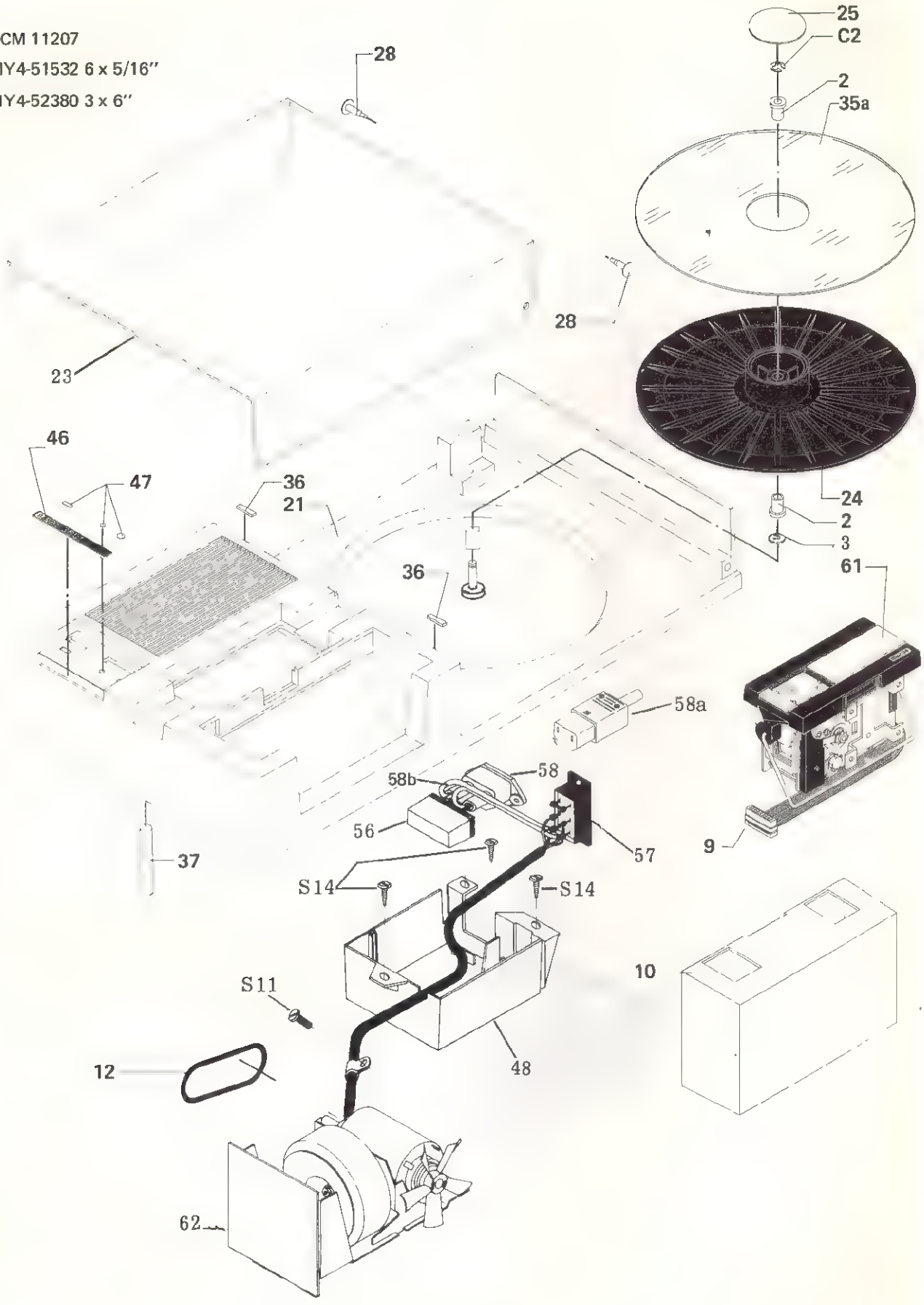


Fig. 7.1 Top Cover, Exploded View

S12 MY4-51349 6 x 3/8"
S14 MY4-4

S12 MY4-51349 6 x 3/8"
S14 MY4-52380 3 x 6"
N3 6M3 S03
W2 SCL 11207
W3 SCL 100124

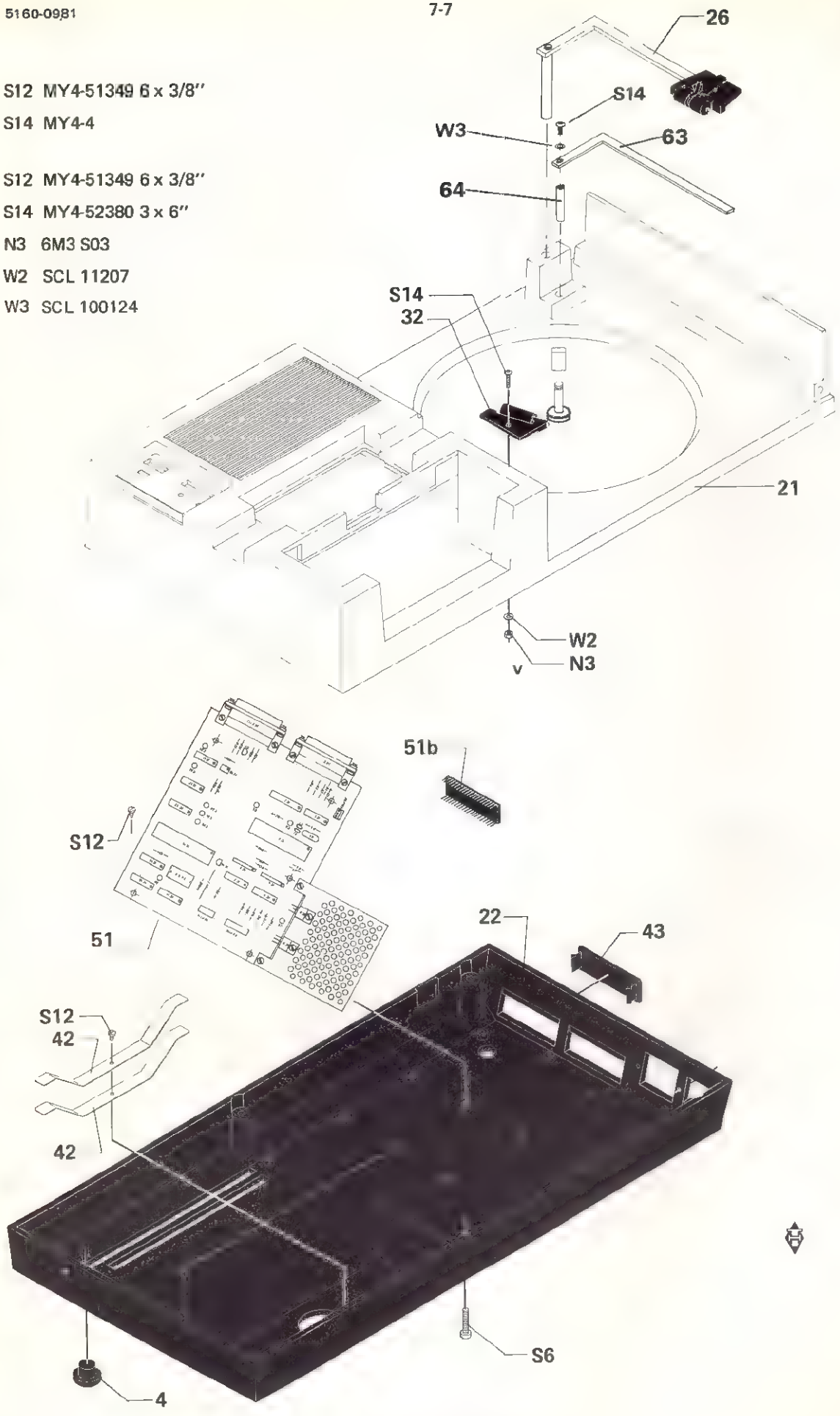


Fig. 7.2 Base, Exploded View

S1 ECS 2 x 10 S03
S4 ECS 4 x 10 S03
S6 ECS 4 x 16 S03
S8 B6LS 3 x 8
S11 MY4-51532 6 x 5/16"
S12 MY4-51349 6 x 3/8"
L1 MY4-21499
N1 SBM 6M x 2,5

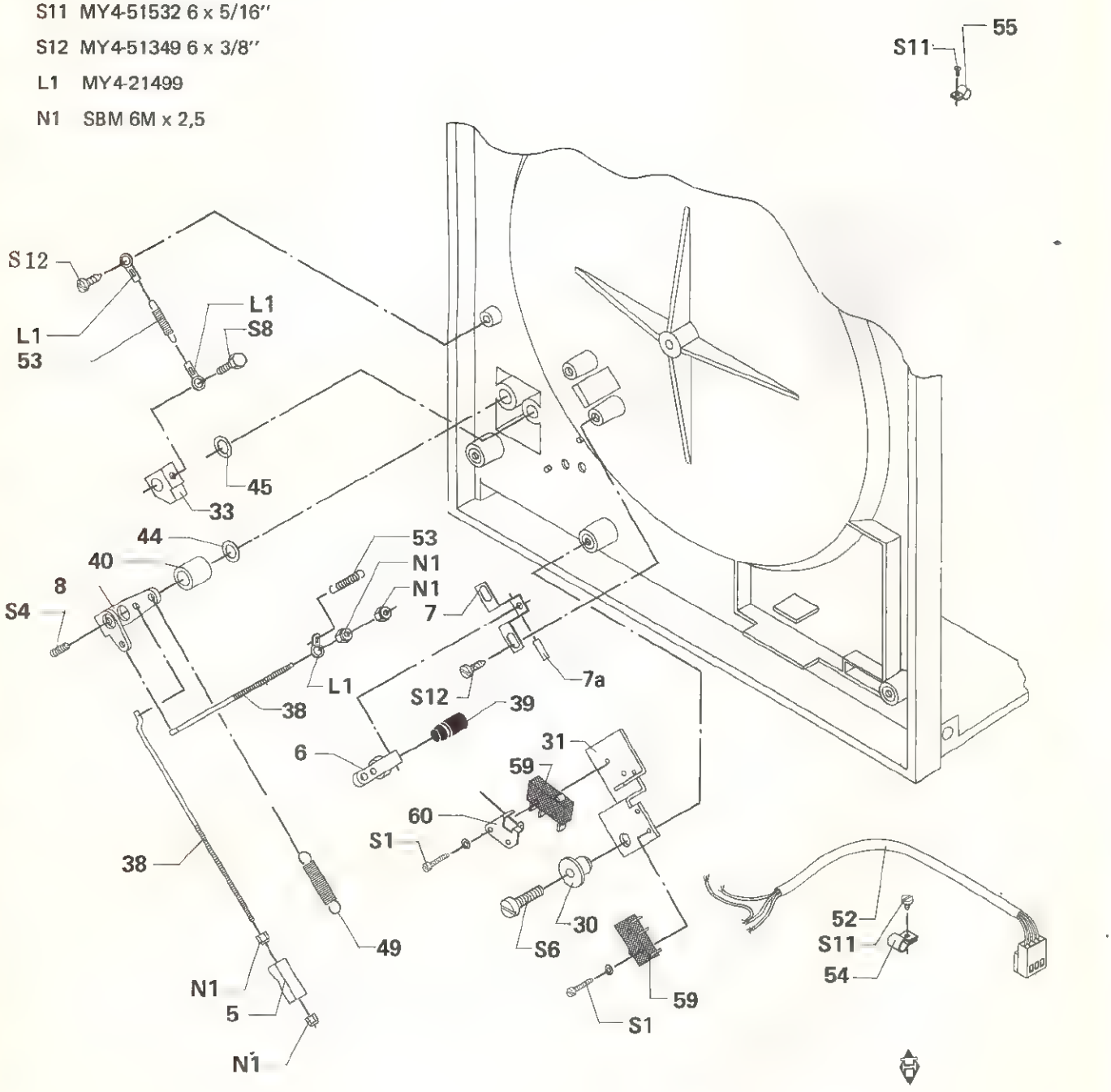


Fig. 7.3 Tape Mechanism, Exploded View

S3 ECS 3 x 8 S03
S4 ECS 3 x 16 S03
N3 6M3 S03

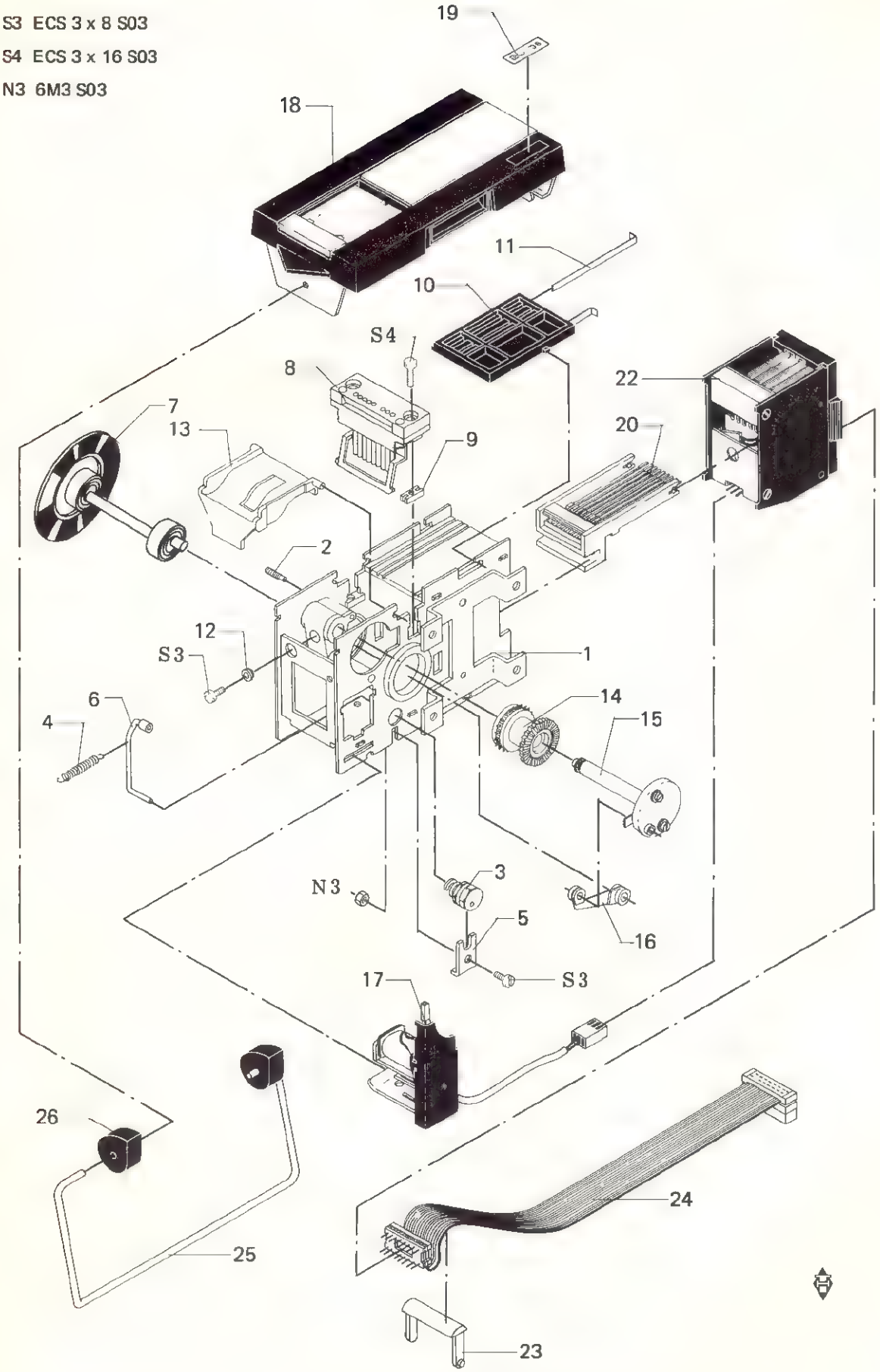


Fig. 7.4 GNT 36 Punch Mechanism, Exploded View

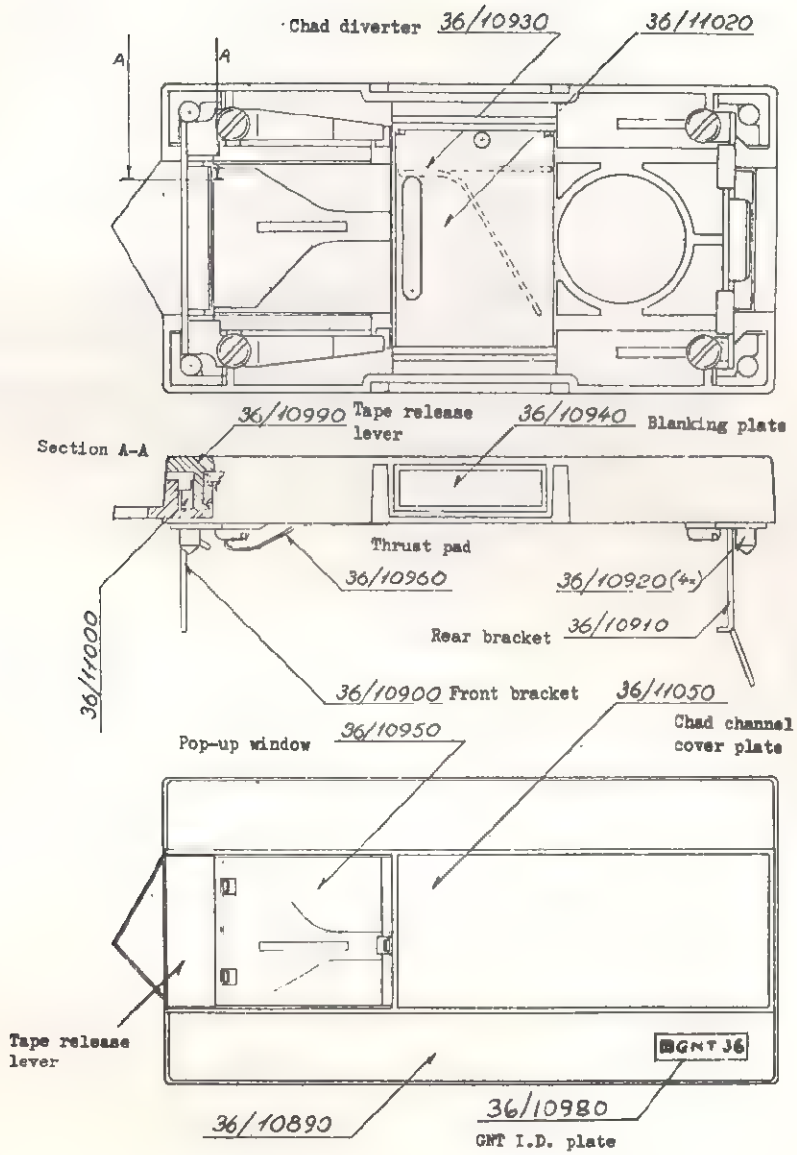


Fig. 7.5 Punch Mechanism Top Cover Z36/10840

SECTION 8 - APPENDIX

GNT 3601 SERIAL INTERFACE

8.1 GENERAL (See fig. 8.1)

The serial interface for the GNT 3601 is built up around a UART (Universal Asynchronous Receiver/ Transmitter) and is located on the logic p.c.b. together with the parallel interface. The UART converts the serial input signal to a parallel signal which is then fed to the parallel input.

The interface signals (data and control) conform to V24/RS232C standard. The interface also includes a current loop input.

A DIP switch on the p.c.b. selects 10 Baud rates from 50 to 1200 Baud, as well as odd or even parity check, and word lengths of 5 to 8 bits.

The serial interface will accept data when DSR is high or floating. When DSR is low, the UART is reset.

If a parity, overrun, or framing error occurs, TD will go high.

Before the data buffer in the microprocessor is full, DTR will go low and stay low until the buffer is empty. DTR can therefore be used as a handshaking signal and must be used when receiving at 1200 Baud.

When the serial interface is to be used, the parallel interface must be strapped for positive DATA and PUNCH signals (factory setting).

The p.c.b. can be strapped to accept DC2/DC4 start/ stop signals.

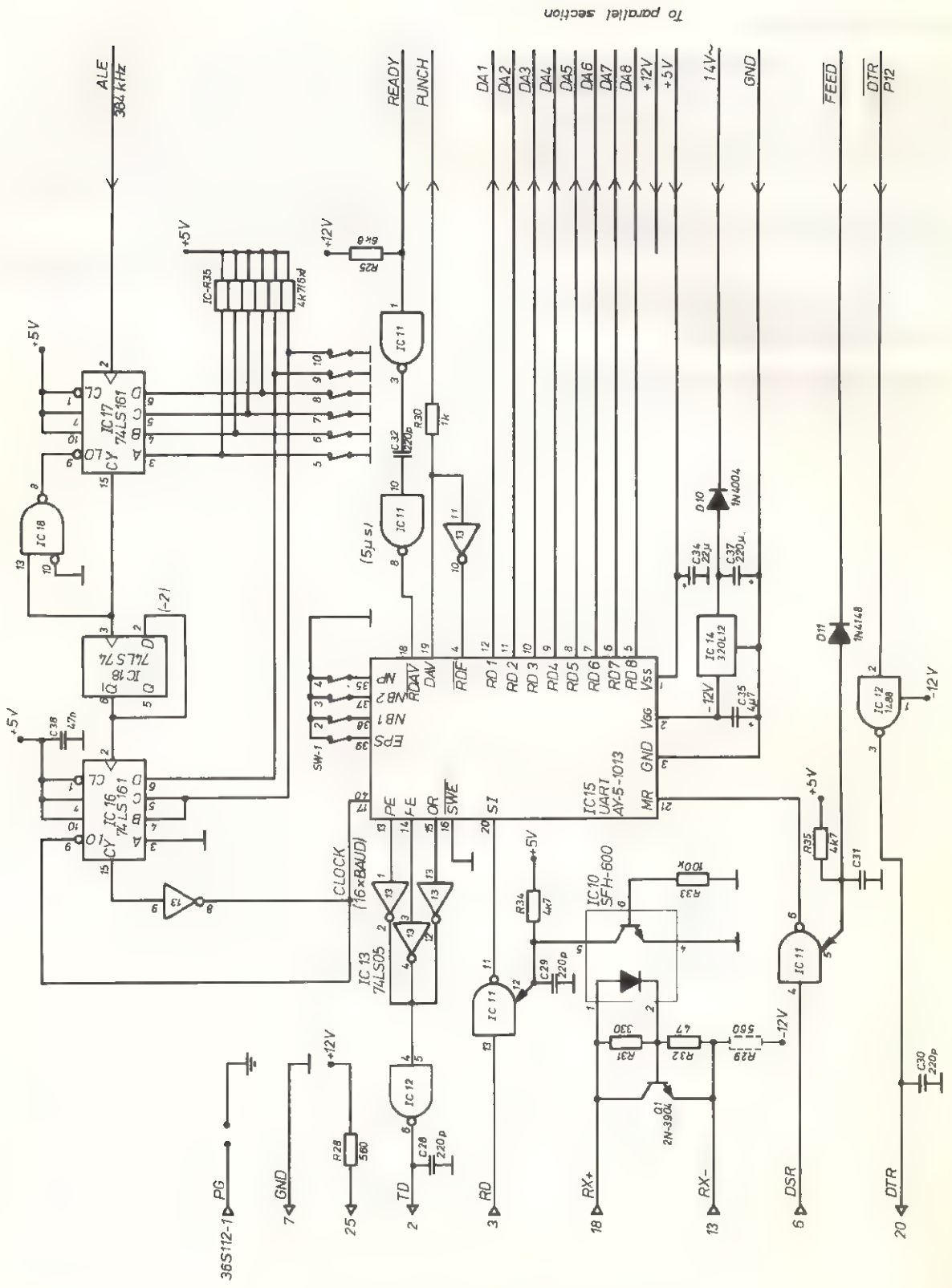


Fig. 8. 1a, Serial Interface Circuit Diagram

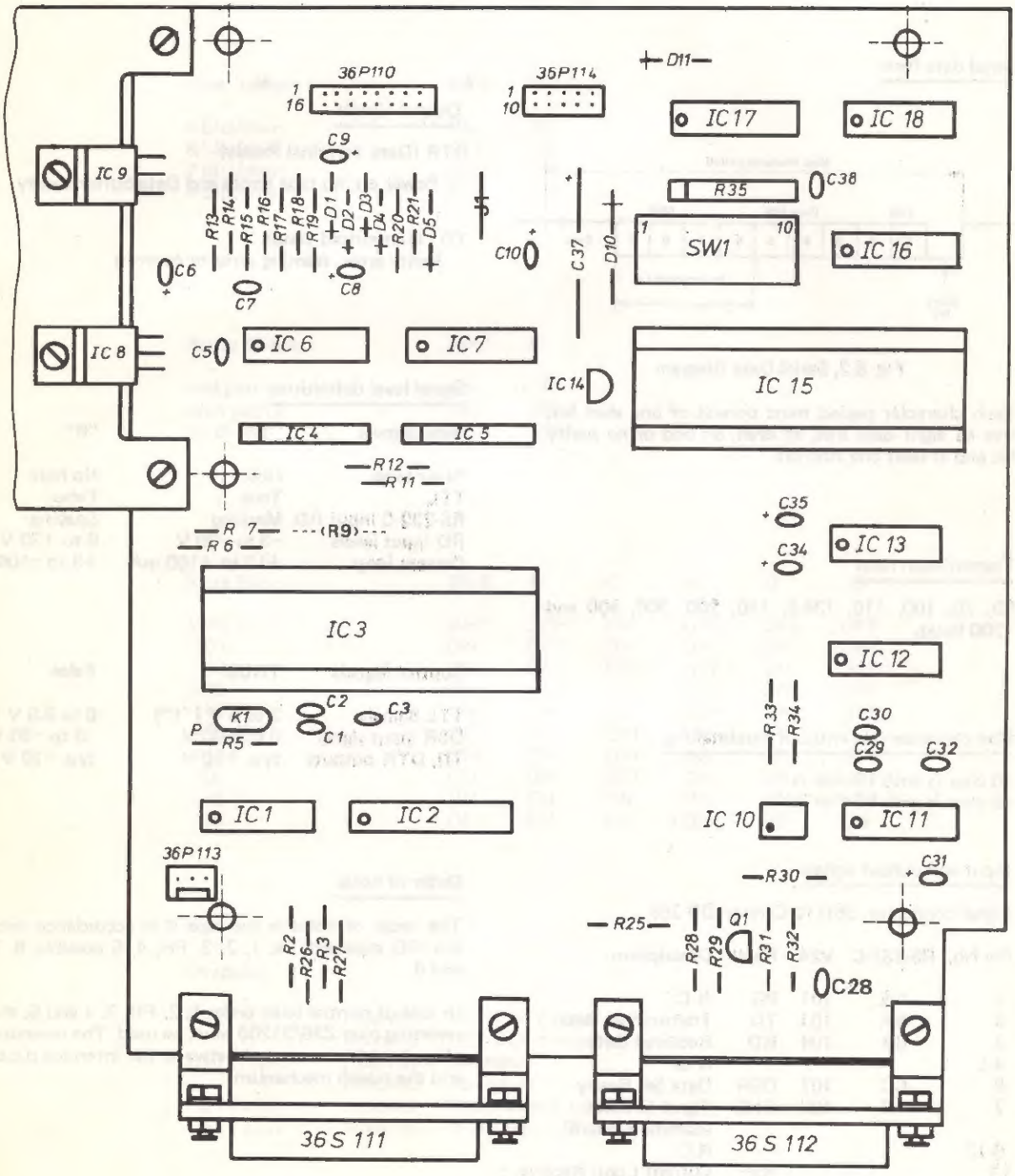


Fig. 8. 1b, Component Layout, Logic Board, Parallel/Serial Interface

8.2 SPECIFICATIONS

Interface, serial

EIA standard, RS-232-C
CCITT standard, V-24
20/60 mA current loop

Serial data form

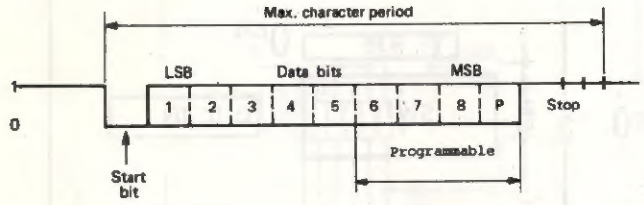


Fig. 8.2, Serial Data Diagram

Each character period must consist of one start bit, five to eight data bits, an even, an odd or no parity bit and at least one stop bit.

Transmission rates

50, 75, 100, 110, 134.5, 150, 200, 300, 600 and 1200 Baud.

Max character rate without handshaking

70 char./s with 75 char./s
45 char./s with 50 char./s

Input and output signals

Signal connector, 36s112 Cannon DB-25s

Pin No.	RS-232-C	V24	Name	Description
1	AA	101	PG	N.C.
2	BA	103	TD	Transmitted Data
3	BB	104	RD	Received Data
4-5				N.C.
6	CC	107	DSR	Data Set Ready
7	AB	102	GND	Signal Ground (common return)
8-12				N.C.
13			Rx−	Current Loop Receive, −
14-17				N.C.
18			Rx+	Current Loop Receive, +
19				N.C.
20	CD	108.2	DTR	Data Terminal Ready
21-24				N.C.
25			+12 V	D.C. output, 12 V, 20 mA max.

Control signals

DSR (Data Set Ready):
Resets the Serial Interface

DC2/DC4 (Remote Control):
Start/stop punch
DC2 = "CNTRLR", DC4 = "CNTRLT"

Output signals

DTR (Data Terminal Ready)
Power on, no tape errors and Data buffer empty

TD (Transmitted Data):
Parity error, framing error or overrun

Signal level definitions

Data Signals	"1"	"0"
Paper tape	Hole	No hole
TTL	True	False
RS-232-C input RD	Marking	Spacing
RD input levels	−3 to −30 V	0 to +30 V
Current loop	+12 to +100 mA	+3 to −100 mA

Control Signals	TRUE	False
TTL Signals	2 to 5 V ("1")	0 to 0.8 V ("0")
DSR input signal	0 to +30 V	−3 to −30 V
TD, DTR outputs	typ. +10 V	typ. −10 V

Order of holes

The order of holes in the tape is in accordance with the ISO standard, i.e. 1, 2, 3, FH, 4, 5 possibly 6, 7 and 8.

In case of normal telex order 1, 2, FH, 3, 4 and 5, the reversing plug Z36/31200 must be used. The reversing plug should be mounted between the interface p.c.b. and the punch mechanism.

8.3 PROGRAMMING INSTRUCTIONS

Char. Length	SW-2	-3
5 bits/char.	ON	ON
6 bits/char.	OFF	ON
7 bits/char.	ON	OFF
8 bits/char.	OFF	OFF

Parity Check	SW-1	-4
odd parity	ON	ON
even parity	OFF	ON
no check	OFF	OFF

Baud Rate	SW-5	-6	-7	-8	-9	-10
1200 bit/s	OFF	OFF	ON	OFF	OFF	OFF
600	ON	OFF	OFF	OFF	ON	OFF
300	ON	ON	OFF	OFF	ON	OFF
200	ON	OFF	ON	OFF	ON	OFF
150	ON	ON	ON	OFF	ON	OFF
134.5	OFF	OFF	OFF	ON	ON	OFF
110	OFF	ON	OFF	ON	ON	OFF
100	ON	ON	OFF	ON	ON	OFF
75	ON	ON	ON	ON	ON	OFF
50	OFF	ON	ON	ON	ON	ON

Strapping

R9 (1 kΩ)	mounted	DC2-DC4 control on
	removed	DC2-DC4 control off
R10 (1 kΩ)	mounted	50 char./s
	removed	75 char./s
R8 (1 kΩ)	removed	Positive Data Logic
R5 (1 kΩ)	mounted	in position P (Positive Logic)

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